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THE JOURNAL ABOUT IDEAS AND LEARNING

VOL 2 ISSUE 1 2008 RS 50

STORY OF STUFF

Consumerism and the Environment

ARVIND GUPTA

Scientist turned Toymaker

PHOTO PRIMER

Everybody has a Story

ACTIVIST THEATRE

The World of Pandies'

INCLUSIVE CLASSROOMS

Count Me In

ONE TWO MANY

The Language of Maths

NOTES FROM THE TRENCHES

New Comic Section!

Number of lives touched - still counting...

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EDITORS' NOTE



It's hard to tell a difficult story simply. Which is why we stopped in our tracks when we saw Annie Leonard's 'Story of Stuff' for the first time. The premise of the film is a familiar one – we are using way too much stuff – but the treatment was refreshing and accessible. 'Story of Stuff' exposes the connections between a huge number of environmental and social issues in consumerist society. It is a mark of Leonard's successful storytelling that she has received fan mail from fourth graders and Oxford dons alike.

Fittingly, that the other major story in this issue of Mindfields, is about visionary scientist Arvind Gupta, and his efforts to create educational toys out of 'stuff' that routinely makes its way into dustbins. Might make you reconsider some lifestyle issues, just like it did, us.

Other highlights of the issue include an interview with the feisty Kiran Sethi of Riverside School, a retrospective about the National Knowledge Commission, and US-based writer/photographer Sara Steinberg's experiences about looking through an unfussy camera lens.

Issue 5 marks the completion of one insightful, exciting year of Mindfields. There are many new plans in the offing, and the website has been revamped (www.mindfields.in). I hope you continue to support Mindfields. Subscription forms for you and your likeminded friends are on Page 3!

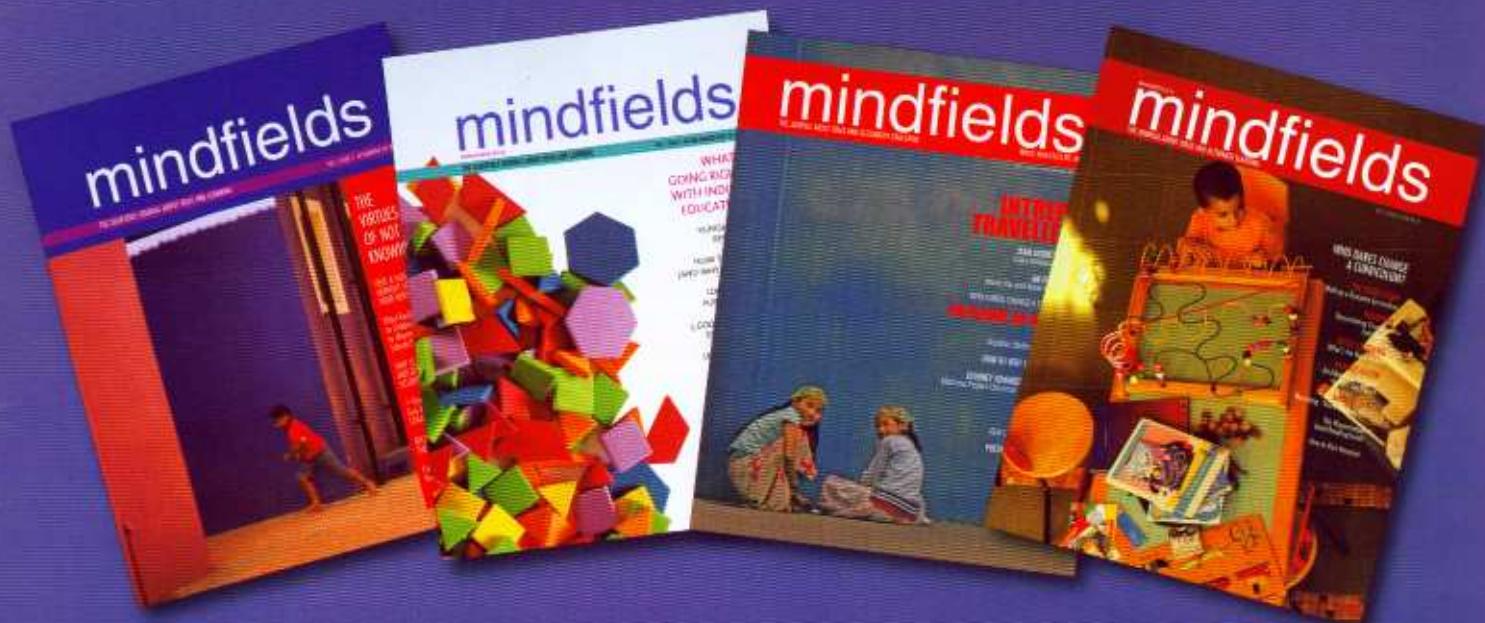
A handwritten signature in black ink, appearing to read 'AP'.

Amruta Patil

A handwritten signature in black ink, appearing to read 'LUKE HAOKIP'.

Luke Haokip

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MAILBOX

INTERESTING PROJECT IN SARWAAR, RAJASTHAN

You are doing great work with Mindfields - congratulations!

I wanted to tell you about a programme for school dropouts and children who are not enrolled in schools in villages around Sarwaar, Arain district, Rajasthan. It is being run by the Ajmer Adult Education Association, which was started by my mother in 1970.

We have a very creative Project Director, who with his team, is doing good work with literacy, health, and general awareness. Recently they've started bringing out a 'rural' newspaper. The project is funded by Tata Trust and is designed on the lines of 'Doosra Dashak' (run by former Education Sec. Anil Bordia). It might make a Mindfields story.

Anuradha Marwah
New Delhi

AN INSPIRING FAMILY

I happened to read a copy of your magazine and I liked it immensely. I would like to tell you about a couple who has set a beautiful example for others to follow. The wife opened a Montessori school after she found that most of the schools were charging very high fees and were not following the true play-way method of teaching. Her school is now about five years old and has created a name for itself. Her husband has set an example of a different sort. He wanted their daughter, who was a little on the heavier side, to pick up some active

sports. In order to motivate her and distract her from watching senseless TV programmes, he enrolled himself in a Tennis club and started playing tennis. Sure enough, after watching her dad play the game, the daughter got interested and now regularly goes to play tennis. There are very few fathers who would go to such lengths in order to set an example. He started learning the sport at the age of forty!

Suraiya Khan
by email

DOCUMENTARY FILMMAKER SEEKS INFO

I'm an independent documentary filmmaker and have been researching alternative education techniques for a film we (A two-member production unit called Hit and Run films) have in mind, a process that suddenly gained definition once a colleague gave me a copy of Mindfields. I must say that it's a very special publication, one which gave us many a discussion-worthy sessions. Hoping for a little bit of guidance from readers of your magazine:

- Has WATIS already made a film that explores the success/problems etc in applying alternative education techniques?
- Who would be the correct person to write/speak with to take this idea further?
- If not WATIS, could you suggest somebody else we could take our project to for funding? What we have in our heads is film which also translates into a user-friendly kit with an innovative distribution network, so that parents anywhere, can look at what options they have

before they dump their kids the regular public school-route.

Any lead you might provide to us, will be most useful.

Shabani Hassanwalia

Readers, If you have information that might help Shabani, mail us.

Ed.

DELECTABLE PIECE!

Lalitha Visveswaran's piece on 'Resuscitating Comatose Lunchboxes' (Mindfields Issue 4) was a real treat! Her writing was beautiful and evocative - and so were the pictures. I thought they were stock photos, and was pleasantly surprised to see the photo credit.

I hope schools take a cue from Martand Khosla's 'Dynamic Playgrounds' and think beyond boring rusty *jhoolas*.

Keep up the great work! I wish Mindfields were more frequent!

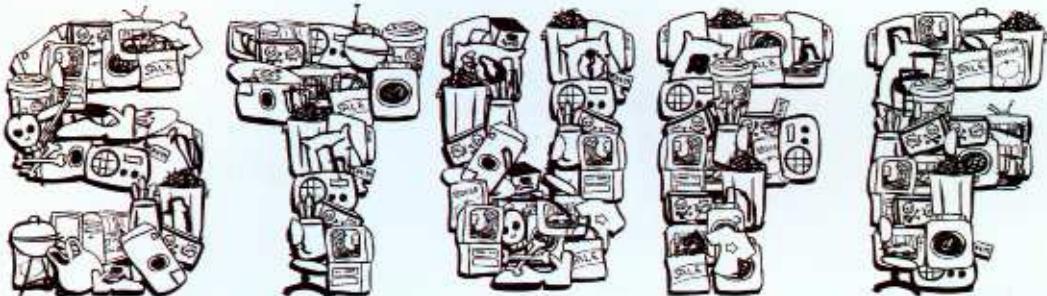
Vageesh T.
Belgaum

You will be happy to know that two schools wrote in to us to find out how they could contact Martand Khosla about their own school's playgrounds!

Ed.

DO YOU HAVE CRITIQUE TO OFFER US? OR A STORY IDEA OR EXPERIENCE YOU'D LIKE TO SHARE? WE'D LOVE TO HEAR FROM YOU.
MAIL US AT: EDITOR@MINDFIELDS.IN
SELECTED LETTERS WILL BE PUBLISHED IN THE NEXT ISSUE OF MINDFIELDS.

THE STORY OF



WITH ANNIE LEONARD

Buy the latest, discard the oldest: we all know this pattern of behavior isn't working so well, but no one has broken down the Whys and Hows of it as succinctly, smartly, gently and as well as Annie Leonard. Before you start reading this piece, get online. Go to www.storyofstuff.com and watch the 20-minute animated film on its home page. It might make you rethink your cell phone upgrade. Or better still, it might make you alter the way you live.

It's creating a stir worldwide – two million unique hits and rising. Annie Leonard (*left*), creator and narrator of 'Story of Stuff' – is an expert on the materials economy. A good place to begin. In the deceptively straightforward animation and plainspeak of 'Story of Stuff' – she examines the social, environmental and global costs of extraction, production, distribution, consumption and disposal. Viewers are taken on a provocative, eye-opening tour of the real costs of our consumer driven culture – from resource extraction to gadget incineration. It might make you rethink your iPod upgrade.

The idea for 'Story of Stuff' began as Annie's personal musing over the question, "Where does all the stuff we buy come from, and where does it go when we throw it out?" She traveled the world in pursuit of the answer to this seemingly innocent question, and what she found along the way were some very guilty participants and their unfortunate victims.

Her studies led her to pinpoint the era when hysterical consumerism began – with the economic policies of the post-World War II era – notions that are still driving much of the U.S. and global economies today, notions that are being fuelled by economic manipulation.

Leonard's stats are largely based on the consumption habits of the United States of America, yet anyone who has watched malls mushrooming in Indian metros, and seen lifestyles of teenagers do a volte face in the course of a decade, will know that the problem is not that far removed from home. The problem is here, it is affecting us all. There is no choice but to act fast.

From the short shelf life of personal computers to the perceived outdatedness of oversize sunglasses 'this season' - Annie Leonard demonstrates that products are either designed to be regularly replaced or to convince consumers that their stuff needs to be upgraded.

Leonard's early thoughts on the 'Story of Stuff' evolved as a bid to inspire an assorted group of activists who met to polish their leadership skills. She realised soon that despite her best efforts, she wasn't getting through to the other participants. 'Changing the paradigm of our 'materials relationship' was something that was causing eyes to glaze, rather than open wide. People just didn't get what 'materials' had to do with democracy or whatever else they were working with. Annie Leonard, however, knew that democracy has *everything* to do with materials.

She returned to the group in some days, with a set of simple drawings on chart paper. Instead of talking about materials, she talked about "stuff" - all the stuff we eat, wear, use, throw out, burn, and bury. Instead of merely documenting the flow of resources through consumer society, she started telling her audience the Story of Stuff.

With the help of producer Louis Fox and artist Ruben DeLuna at Free Range Studios, Leonard turned her one-hour talk into a twenty minute film that is snappy enough to catch the attention of people who've never involved themselves in progressive causes. The simple graphics and enthusiastic narration of the film allow everyone to find themselves among the stick figures on screen.

What's the most frequent advice dispensed to people trying to behave more responsibly? Buy green. It's advice that not only encourages still more consumption as means to address the

problem of over-consumption, but it all too often ignores the market forces that have delivered "green" products to the local mall - forces that rarely have any concern for the resources or people damaged along the way.

While the first part of Annie's film is devoted to describing the problems of our current unsustainable culture of disposable goods, it's the final part that deserves special attention. Rather than stopping with the bad news, Annie shoots straight on into the good - we can change. Environmental issues, social justice, and economics all go into making the change toward a fair, sustainable society.

So what is the Story of Stuff?

(Excerpted from the script of Annie Leonard's 'Story of Stuff', available on the film's website)

Chapter 1: Extraction



Extraction is a fancy word for natural resource exploitation which is a fancy word for trashing the planet. We chop down trees, we blow up mountains to get the metals inside, we use up all the water and we wipe out the animals. We're running out of resources. We are using too much stuff. In the past three decades alone, one-third of the planet's natural resources base has been consumed. Gone.

If everybody consumed at U.S. rates (USA has 5% of the world's population, consumes 30% of the world's resources, creates 30% of the world's waste), we would need 3 to 5 planets. And we've only got one. Capitalist countries respond to this limitation by simply taking someone else's stuff! Someone being the 'Third World.'

The average urban person now consumes twice as much as they did 50 years ago. Ask your grandma. In her day, stewardship and resourcefulness and thrift were valued. So, how did this happen? It didn't just happen. It was designed. Here is a leaf from the pages of USA's recent history:

Shortly after the World War 2, the US government was figuring out how to ramp up its economy. Retailing analyst Victor Lebow articulated a solution that has become the norm for the whole system. He said: "Our enormously productive economy...demands that we make consumption our way of life, that we convert the buying and use of goods into rituals, that we seek our spiritual satisfaction, our ego satisfaction, in consumption...we need things consumed, burned up, replaced and discarded at an ever-accelerating rate." President Eisenhower's Council of Economic Advisors Chairman said that "The American economy's ultimate purpose is to produce more consumer goods."

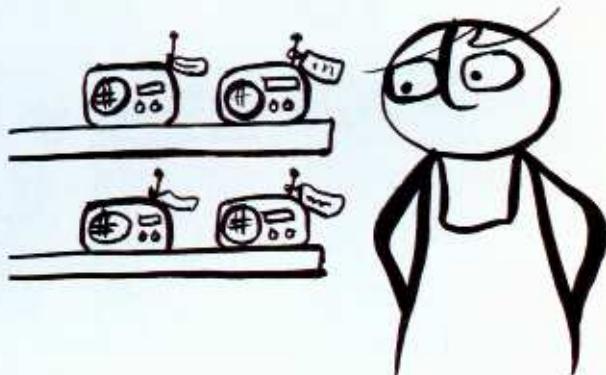
Chapter 2 : Production

Once resource has been acquired, materials move to production. We use energy to mix toxic chemicals in with the natural resources to make toxic contaminated products. There are over 100,000 synthetic chemicals in commerce today. Only a handful of these have even been tested for human health impacts and NONE of them have been tested for synergistic health impacts, that means when they interact with all the other chemicals we're exposed to every day. So, we don't know the full impact of these toxics on our health and environment. But we do know one thing: Toxics in, Toxics Out. As long as we keep putting toxics into our production system, we are going to keep getting toxics in the stuff that we bring into our homes, our workplaces, schools. And bodies.

The people who bear the biggest brunt of these toxic chemicals are factory workers, many of whom are women of reproductive age. They're working with reproductive toxics, carcinogens and more. What kind of woman of reproductive age would work in a job exposed to reproductive toxics, except one who had no other option? And that is one of the 'beauties' of this system. The erosion of local environments and economies in the 'Third World' (where most of the unpleasant production work is handled) ensures a constant supply of people with no other option.

Globally 200,000 people a day are moving from environments that have sustained them for generations, into cities - many to live in slums, looking for work, no matter how toxic that work may be. So, you see, it is not just resources that are wasted along this system, but people too. Toxics in, toxics out.

Chapter 3 : Distribution



When resources are turned into products they move back for distribution. Distribution quite simply, amounts to selling all this toxic contaminated junk as quickly as possible. The goal is to keep the prices down, keep the people buying and keep the inventory moving.

How do they keep the prices down? It's all about externalizing the costs. A cheap radio set's price tag does not cover all the extraction, production, transportation costs it incurs. Instead, money is skimped on along the way, people involved in the process pay the price. The real cost of making stuff isn't captured in the price.

Chapter 4: Consumption



Consumption is the heart of the system, the engine that drives it. It is so important to prop up this whole flawed

system, that protecting it is of paramount importance to the government and to the corporations.

We are becoming **uber-consumers**. We are fast losing our primary identity as citizens, mothers, teachers, farmers – and becoming consumers instead. Increasingly, our value is measured and demonstrated by how much we consume. We are encouraged to shop, shop, shop. And the materials keep flowing in.

How did the forces that be get us to jump aboard this consumer bandwagon so enthusiastically? Well, two of their most effective strategies are planned obsolescence and perceived obsolescence.

Planned obsolescence is another word for “designed for the dump.” It means they actually make stuff that is designed to be useless as quickly as possible so we will chuck it and go buy a new one.

It's obvious with stuff like plastic bags and coffee cups, but now it's even big stuff: mops, DVDs, cameras, barbeques even, everything! Have you noticed that when you buy a computer now, the technology is changing so fast that within a couple years, your new computer is actually an impediment to communication. And the piece that changes each year is just a tiny little piece in the corner. Designers actually plan how fast they can make stuff break and still leaves the consumer with enough faith in the product to go buy another one.

But stuff can not break fast enough to keep this arrow afloat, so there's also “perceived obsolescence.” Perceived obsolescence convinces us to throw away stuff that is still perfectly useful. How do they do that? Well, they change the way the stuff looks so if you bought your stuff a couple years ago, everyone can tell that you haven't contributed to the altar of Consumption recently and it can be embarrassing. Fashion is another prime example of this. Have you ever wondered why women's shoe heels go from fat to skinny to fat to skinny? It is not because there is some debate about which heel structure is the most healthy for women's feet!

Media also helps by hiding all of this, so the only part of the materials economy we see is the shopping. The extraction, production and disposal all happens outside our field of vision.

Chapter 5: Disposal



So in the end, what happens to all the stuff we buy anyway? Most of it goes out in the garbage. And that brings us to disposal. All of this garbage – stuff we bought not long ago – mostly gets dumped in a landfill, or if you're really unlucky, first it's burned in an incinerator and then dumped in a landfill. Either way, both pollute the air, land, water and, don't forget, change the climate. Incineration is really bad. Remember those toxics back in the production stage? Burning the garbage releases the toxics up into the air. Even worse, it actually makes new super toxics. Some companies in the West don't want to deal with building landfills and incinerators here, so they just export the disposal too.

Why recycling can never be enough



What about recycling? Does recycling help? Yes, recycling helps. Recycling reduces the garbage and it also reduces the pressure to mine and harvest new stuff. We should all recycle – but recycling is not enough.

For one, the waste coming out of our houses is just the tip of the iceberg. For every one garbage can of waste you put out on the curb, 70 garbage cans of waste were made upstream just to make the junk in that one garbage can full of waste you dispose.

So even if we could recycle 100 percent of the waste coming out of our households, it doesn't get to the core of the problem. Also

much of the garbage can't be recycled, either because it contains too many toxics or it is actually designed NOT to be recyclable in the first place. Like those milk tetrapaks with layers of metal and paper and plastic all smooshed together.

So you see, it is a system in crisis. All along the way, we are bumping up against a lot of limits - from changing climate to declining happiness. The good thing about such an all-pervasive problem is that there are so many points of intervention. There are people working here on saving forests, labour rights and fair trade and conscious consuming - all this work is critically important but things are really going to start moving when we see the connections, when we see the big picture. When people along this system get united, we can reclaim and transform this linear system into something new, a system that doesn't waste resources or people.

Another Way



What we really need to chuck is this old-school throw-away mindset. There's a new school of thinking on this stuff and it's based on sustainability and equity: Green Chemistry, Zero Waste, Closed Loop Production, Renewable Energy, Local living Economies. It's already happening. Some people say it's unrealistic, idealistic, that it can't happen. But I say the ones who are unrealistic are those that want to continue on the old path. The 'old way' didn't just happen by itself. People created it. And we're people too. So let's create something new.

The film's Web site, www.storyofstuff.com, serves as an interactive launch pad for information and activism. The site features hundreds of organizations working to change the cycle of the materials economy and offers viewers "another way."

The site includes resources and information, a footnoted script, a suggested reading list and ideas for educational activities and discussion topics for local screenings.

10 Little and Big Things You Can Do

1. Power down

A great deal of the resources we use and the waste we create is in the energy we consume. Look for opportunities in your life to significantly reduce energy use: drive less, fly less, turn off lights, buy local seasonal food (food takes energy to grow, package, store and transport), wear a sweater instead of turning up the heat, buy used or borrow things before buying new, recycle. All these things save energy and save you money. And, if you can switch to alternative energy by installing solar panels on your home, bravo!

2. Waste less

There are hundreds of opportunities each day to nurture a Zero Waste culture in your home, school, workplace, community. This takes developing new habits which soon become second nature. Use both sides of the paper, carry your own mugs and shopping bags, get printer cartridges refilled instead of replaced, compost food scraps, avoid bottled water and other over packaged products, upgrade computers rather than buying new ones, repair and mend rather than replace....the list is endless! The more we visibly engage in re-use over wasting, the more we cultivate a new cultural norm, or actually, reclaim an old one!

3. Talk to everyone about these issues

At school, your neighbors, in line at the supermarket, on the bus. A student once asked Cesar Chavez (American Labor leader and civil rights worker) how he organized. He said, "First, I talk to one person. Then I talk to another person." "No," said the student, "how do you organize?" Chavez answered, "First I talk to one person. Then I talk to another person." You get the point. Talking about these issues raises awareness, builds community and can inspire others to action.

4. Make Your Voice Heard

Write letters to the editor and submit articles to local press. In the last two years, and especially with Al Gore winning the Nobel Peace Prize, the media has been forced to write about Climate Change. As individuals, we can influence the media to better represent other important issues as well. Letters to the editor are a great way to help newspaper readers make connections they might not make

without your help. Also local papers are often willing to print book and film reviews, interviews and articles by community members. Let's get the issues we care about in to the news.

5. Detox your body, Detox your home

Many of today's consumer products – from children's pajamas to lipstick – contain toxic chemical additives that simply aren't necessary. Research online (for example, www.cosmeticsdatabase.com) before you buy to be sure you're not inadvertently introducing toxics into your home and body. Tell your friends about toxics in consumer products. Together, ask the businesses why they're using toxic chemicals without any warning labels. Getting the toxics out of production at the source is the best way to ensure they don't get into any home and body.

6. Unplug (the TV and computer)

The average person watches T.V. over 2 hours a day, hours filled with messages about stuff we should buy. Hours that could be spent with family, friends and in our community. On-line activism is a good start, but spending time in face-to-face civic or community activities strengthens the community and many studies show that a stronger community is a source of social and logistical support, greater security and happiness. A strong community is also critical to having a strong, active democracy.

7. Park your car and walk

Car-centric lifestyles lead to more greenhouse gas emissions, fossil fuel extraction, conversion of agricultural and wild lands to roads and parking lots. Driving less and walking more is good for the climate, the planet, your health, and your wallet.

8. Change your lightbulbs, and paradigm

Changing lightbulbs is quick and easy. Energy efficient lightbulbs use 75% less energy and last 10 times longer than conventional ones. That's a no-brainer. But changing lightbulbs is just tinkering at the margins of a fundamentally flawed system unless we also change our paradigm. A paradigm is a collection of assumptions, concepts, beliefs, and values that together make up a community's way of viewing reality. Our current paradigm dictates that more stuff is better, that infinite economic growth is desirable and possible, and that pollution is the price of progress. To really turn things around, we need to nurture a different paradigm based on the values of sustainability, justice, health, and community.

9. Recycle your trash

Recycling saves energy and reduces both waste and the pressure to harvest and mine new stuff. Unfortunately, many cities still don't have adequate recycling systems in place. In that case you can usually find some recycling options in the phone book to start recycling while you're pressuring your local government to support recycling city-wide.

10. Buy Green, Buy Local, Buy Less.

Shopping is not the solution to the environmental problems we currently face because the real changes we need just aren't for sale in even the greenest shop. But, when we do shop, we should ensure our money supports businesses that protect the environment and worker rights. Look beyond vague claims on packages like "all natural" to find hard facts. Is it organic? Is it free of super-toxic PVC plastic? When you can, buy local products from local stores, which keeps more of our hard-earned money in the community. Buying used items keeps them out of the trash and avoids the upstream waste created during extraction and production. But, buying less is the best option of all. Less pollution. Less waste. Less time working to pay for the stuff. Sometimes, less really is more. □



Annie Leonard is an expert in international sustainability and environmental health issues, with over 20 years of experience investigating factories and dumps around the world. Coordinator of the Funders Workgroup for Sustainable Production and Consumption, a funder collaborative working for a sustainable and just world, Annie communicates worldwide about the impact of consumerism and materialism on global economies and international health. She has traveled to over 30 countries, including Haiti, Bangladesh, India, the Philippines, Pakistan and South Africa, in her work investigating and promoting anti-pollution issues internationally.

Annie's efforts over the past two decades to raise awareness about international sustainability and environmental health issues has included work with Global Anti-Incinerator Alliance, Health Care without Harm, Essential Information and Greenpeace International. She currently serves on the boards of GAIA, the International Forum for Globalization and the Environmental Health Fund. Previously she has served on the boards of the Grassroots Recycling Network, the Environmental Health Fund, Global Greengrants India and Greenpeace India. In 1990s, Annie visited countries throughout Asia to track exported waste from the U.S. and Europe. She documented her findings in many articles and testified before the U.S. Congress in 1992 on the issue of international waste trafficking, in an effort to ban US waste exports to the Third World.

Annie did her graduate work in city and regional planning at Cornell University, New York. She resides in California with her daughter.

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From Common Sense to Common Practice

School principal, entrepreneur, Ashoka Award recipient for knockout ideas - Kiran Bir Sethi is the effervescent new face of school education in India. The Mindfields team met her for a chat in Ahmedabad.

TEXT: AMRITA PATIL

PHOTOS: LUKE HAOKIP, THE RIVERSIDE SCHOOL

TELL US SOMETHING ABOUT YOUR CHILDHOOD

KS: I had a fantastic childhood. Dad was a gold medalist from IIT Kharagpur - one of the first guys in India to get awarded the best engineer award, all that. First of many things, actually. But more important than that - the first thing he did was understand that we all have a mind. Being encouraged to formulate one's ideas and expressions was liberating. The scripting from my childhood was "I can do it." I went to Bishop Cotton School, Bangalore - thoroughly enjoyed school.

YOU MADE A SHIFT FROM DESIGN TO EDUCATION...

KS: I studied visual communication and graphics at National Institute of Design, Ahmedabad. I met and married Geet (Sethi, billiards champion) and got to travel around the world a lot with him. Then my son Raag was born. Some years down, I started looking for the right school for him - and realised it was just not happening. At one point, I realised that it wasn't enough to sit down and say 'It's not happening.' I needed to get up and do something about it. At that point of time, Eklavya was starting a school, and I enrolled Raag in it.

HOW DID THE PRINCIPAL'S JOB COME ABOUT?

KS: I started actively volunteering at the Eklavya school as a parent. That's where I met Sridhar (Rajagopalan).

One day he told me that they were looking for a principal for the school - and would I be interested in the role? You have to ask him why he decided to ask me. *(Laughs)*. We were just a bunch of people wanting to do something good. We were inspired by the whole idea of getting good minds back into education.

I was thirty-two years old then - and had no background in education. On Teacher's Day, 1998, Sridhar just took me to the staff room and left me there. It was a room full of teachers - all older than I. One of the first things I noticed was that the teachers' motivation level was really low. What needed to be done first was create a team. One of the most important things I started doing then was questioning the way a lot of things were done. When you come unencumbered by an educational background - you can sometimes ask questions that may elude others.

We made a lot of changes within the management structure. The results started showing within six months - student learning significantly improved. The stint at Eklavya taught me a lot - about the things I ought to do, and the things I ought not to do. I was there for a year and a half.

Then, I took a break and started teaching in other schools. I taught creative writing, language, reading skills. It taught me that our kids are really helpless - especially at Grades 8th, 9th, 10th. The disillusionment with schools continued.



With teachers during one of the many discussion sessions

Riverside Primary

Riverside jerseys on the playground

Learning in the outdoors

We had some land across our family home in Ahmedabad that was lying unutilised - and that's how the idea of Riverside School came about. (The land is by the Sabarmati river, and hence the name.) Unfortunately, my son - because of whom this whole thought process about the ideal school started - could not join Riverside. He was much older by then, and if I had to do a good job with this school, I had to do it slow.

TELL US ABOUT THE EARLY DAYS AT RIVERSIDE...

KS: There is no one ideology that Riverside adheres to - it's really all about common sense here. We've taken common sense and put it into common practice.

We started Riverside with a core team of five teachers...and they are still here. They aren't 'teacher' teachers, they are people who like to do this kind of thing. In fact the first person I hired was this woman who used to work out with me. I sort of thought she would be right. We were sitting in the gym and lacing up our shoes when I asked her "Would you like to teach?" she said "I've never taught

before" and I said "No problem, come along."

Not all decisions were this intuitive, though. I never tried to make a muddle of what I didn't know - I put experts there who knew more than I did. I got in touch with the owner of Mallya Aditi School - Geeta - and asked her to come and do a workshop with us. There were times in my previous job when all I knew intuitively was that what we were doing was not correct. So we got the right people in to show how.

THERE IS GREAT EMPHASIS ON TEACHER TRAINING AT RIVERSIDE...

WHEN YOU COME UNENCUMBERED BY AN EDUCATIONAL BACKGROUND - YOU CAN SOMETIMES ASK QUESTIONS THAT MAY ELUDE OTHERS.

KS: How do you establish a high-quality learning environment for students? By first creating a high-quality learning environment for adults. That is not at all expected in most schools. We work very hard to establish that here at Riverside. There is a severe demand here for each practitioner to get better. It's really an accountable environment. It's not "Hey let's all just get along with each other and laugh over a cup of tea." No. It's really demanding. Everyone asks questions, and

there are expectations from one another. There is a requirement to be aligned to goals and to be accountable for what's going on in your class. It's a lot of work.

Every year I have taken a course that helps me be a competent practitioner, that helps me understand my students better. If you have deep respect for your practice, you're never going to sit back and say, "Yeah, I know it all now." You need to keep responding to children. Their needs change, and you need to keep responding. It's really that. It's the partnership between the trust that the student brings and the way you respond. It's an equity model.

I teach full-time in school even today (teachers in this school teach all the subjects to a class) - develop the curriculum, teach and document, take attendance, the works. This enables me to be an instructional leader.

WHAT MAKES RIVERSIDE SPECIAL?

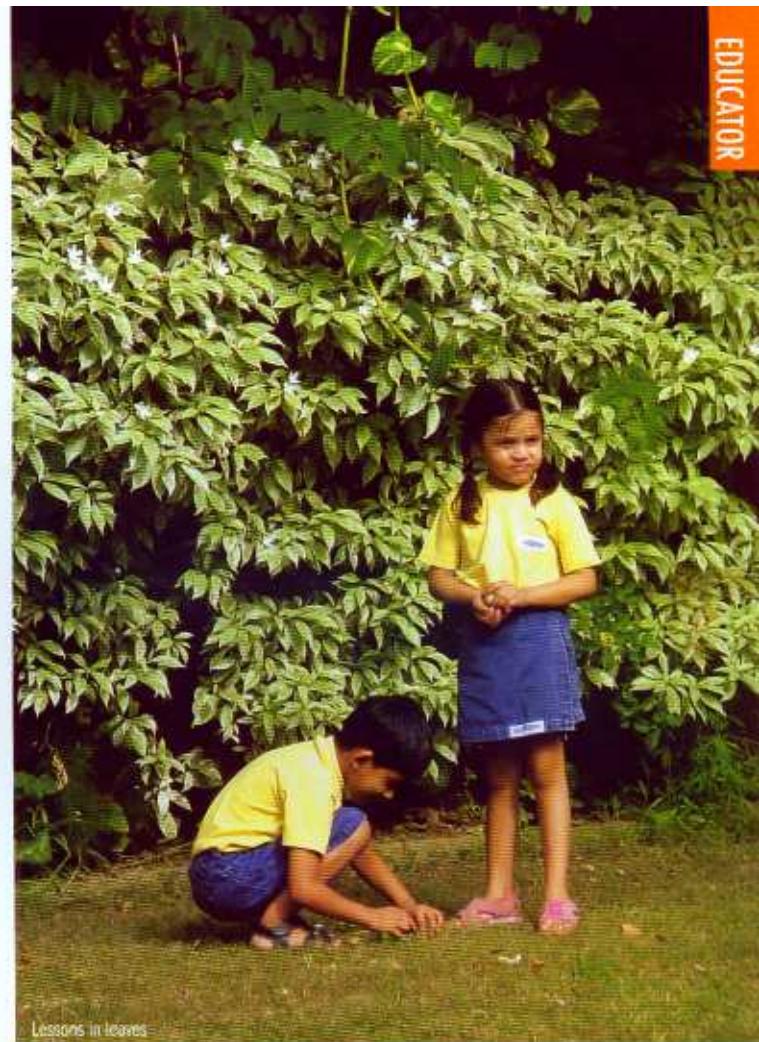
KS: We focus on three main verticals here - Relationships, Rigour and Relevance. 'Relationships' is right on top - relationships with environment, self, peers, teachers. We look at ways in which relationships can be nurtured - buddy systems are created, there is a huge component of bridging the gap effort - us and community, us with parents. Speaking of rigour, my team works forty five days more than any other schools simply because of professional development. The whole idea is - how do you create a win/win deal out of relationships. That is really a strong force.

Then, of course, there is the matter of Relevance. Why do we do what we do. And do we know what we do. If you get that in place, then the program runs independent of monitoring, you just have to nurture it. So you don't have a principal walking around saying, "Are you doing well?" and the teacher stands up just as the principal is walking into the room. That doesn't need to happen here - because the teacher is empowered.

THE FUTURE OF RIVERSIDE...

KS: This school has grown with its first batch and is up to Grade 8 now. We will be an IGCSE school. If we could have reached out to every child, we would have done that. Riverside will not grow in size - in terms of size. But the Riverside impact will grow - in terms of numbers. So right now there are six other schools implementing the Riverside program. We have trained about 60 teachers from different schools. There is a program on in Bhutan - 10-11 people

IF YOU HAVE DEEP RESPECT FOR YOUR PRACTICE, YOU'RE NEVER GOING TO SIT BACK AND SAY, "YEAH, I KNOW IT ALL NOW." YOU NEED TO KEEP RESPONDING TO CHILDREN.



Lessons in leaves

from there will be attending a year-long program at Riverside (Ahmedabad), so that a Riverside School can be started in Bhutan in 2010. We are training the school leaders of the NGO, Akanksha - because they are starting the Akanksha model school.

WHAT HAVE YOU BEEN READING OF LATE?

KS: A lot of my recent reading has been about the brain. Favourites include, 'A Mind at a Time' by Dr. Mel Levine, 'The Red Queen' by Matt Ridley, 'The Language Instinct' by Steven Pinker.

YOU CUT AN UNUSUAL FIGURE IN THE EDUCATOR BRIGADE - MORE TV AD MOM THAN SCHOOL PRINCIPAL. HOW DOES THAT BODE FOR YOU?

KS: (Laughs) I get this all the time. I remember, one of my teachers came in looking for a job and saw me sitting here and thought that I was a very lively receptionist. The first five minutes usually go towards getting past the facade, but that is all. When I talk, people know I mean business. □



ACT, ACTOR, ACTIVIST

Their theatre is neither timid nor polite. It deals with realities most of us recoil from, and choose to forget. Welcome to the world of Sanjay Kumar's *Pandies'*

TEXT: MINDFIELDS, WITH INPUTS FROM PANDIES' THEATRE
PHOTOS: PANDIES' THEATRE

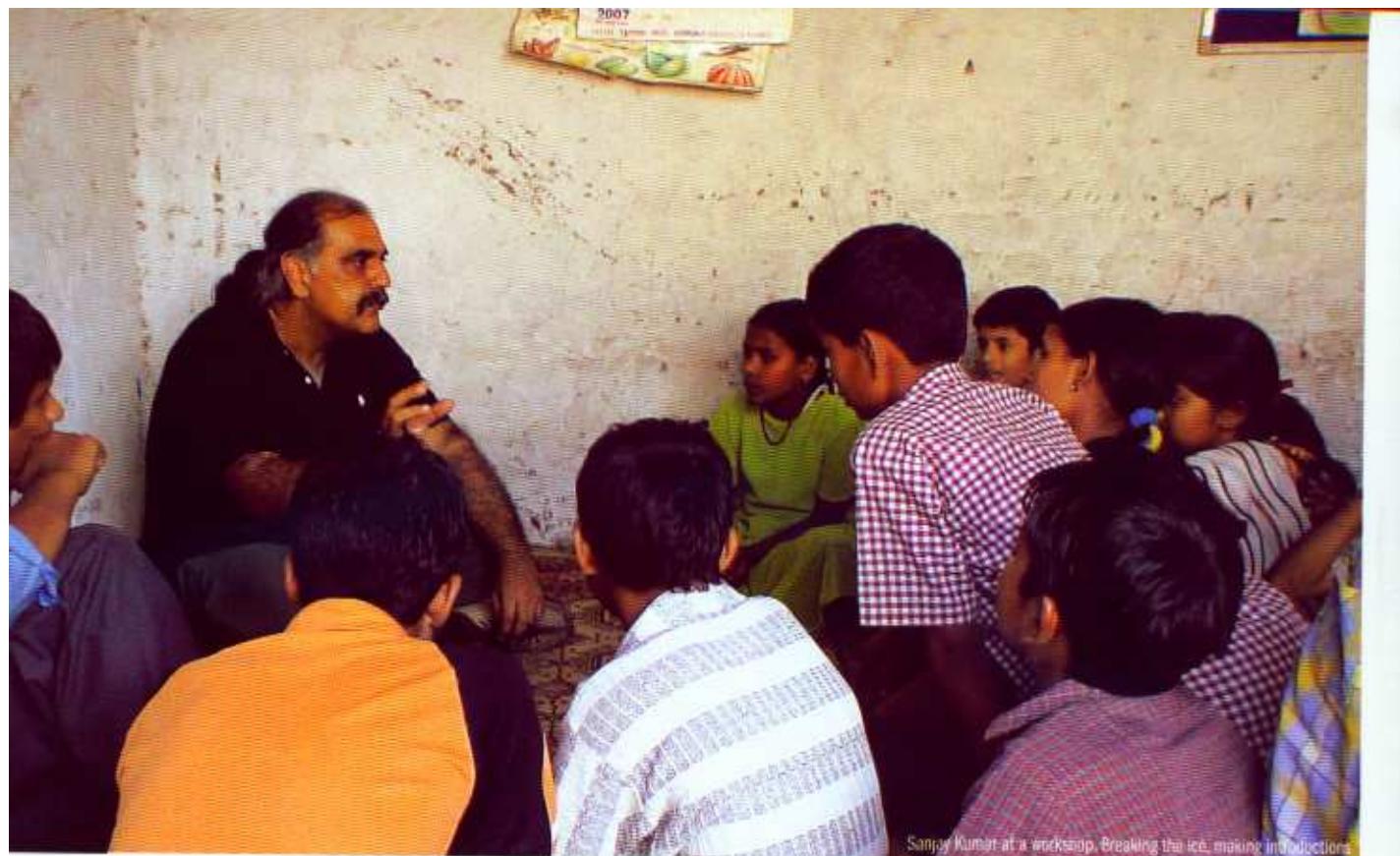
We met Sanjay Kumar after a performance of *Danger Zones* in an academic institution in heartland Uttar Pradesh. It was interesting to watch the tension that the play sent through the audience - *Danger Zones* deals with child rights in the light of the recent Nithari case, and lesbianism in Delhi's slums - some people walked out midway, some stayed behind to engage in a discussion with the director and cast members. The initial tension gave way to a frank, animated dialogue. After forty minutes, the organisers intervened to call it a night.

Post-play interactive sessions are an imperative part of Sanjay Kumar's productions. It is discussion that sows the seed of all his theatre work, and it is discussion that is the logical conclusion of the process. Kumar believes that these conversations will help the audience respond to the message, open up about their own preconceptions and experiences, and ultimately spur social change.

Kumar is an English Professor at Delhi University's Hansraj College. It was called Pandies' - an Anglicized version of Mangal Pandey's last name, a term that remained in British lexicon for years and was used to refer to 'traitors' in the uprising against Britain's rule. 'Uprising' is central to Pandies' Theatre's agenda.

Kumar's troupe, comprises writer Anuradha Marwah, production-in-charge Isha Manchanda and over thirty volunteer members - most of whom are college students from Delhi - who meet for workshops every Sunday. The group is open to all. Plays are directed by Kumar and the multilingual scripts are written in conjunction with Dr. Anand Prakash, another member of the group.

From its early days when it played only in English on the proscenium stage, to activist theatre taking on issues like environment, child rights, rape, HIV and mental health - Pandies' has come a long way.



Sanjay Kumar at a workshop, Breaking the ice, making introductions

Kumar describes his company as theatre from the margins, a theatre of children, women, slum-dwellers, the homeless, and of vulnerable sections and subsections within those margins. Their theatre is neither timid nor polite. It deals with realities most of us recoil from, and choose to forget.

Pandies' work with Women

Eye-opening conversations Kumar had with female students at Hansraj College led to the decision that a large part of Pandies' work would revolve around women's issues. His rationale is simple - "We feel that patriarchal models have failed, and if we want to inhabit a better world it has to be more woman-oriented, more woman-friendly, more feminist." In an oft-repeated quote, Kumar has described himself as a "feminist male in a pre-feminist society", who happened to channel his awareness through activist theater.

Pandies' first step into fulltime activism began with *Mannequins: Sell a Woman, Buy a Body*. This 1997 production focused on prostitution, the patriarchal system that creates the need for it, and the victimization of prostitutes - especially in the aftermath of the HIV outbreak.

She's MAD! (1997-98) explored madness in women. Kumar noticed that labeling women insane had become one more way to deprive women of their rights and

give husbands a clean chit to do as they please. Supported by the Ford Foundation, the play was taken from upscale venues to villages in and around Delhi, with performances in courtyards, streets, lawns, schools, and women's homes.

Veils (1998/99) was, without doubt, Pandies' most controversial production. It traversed diverse classes and regions, and dealt with various forms of rape - such as date rape, committed and justified by so-called 'decent' men in the name of love. The thorny issue of rape within marriage was its climactic episode.

Following the success of the sensitisation against rape campaign, the HRD Ministry asked Pandies' to carry out an intensive theatre-based gender-sensitisation programme in the slum dwellings of Yamuna Pushta in 1999. The programme resulted in the women of the area picking cudgels against drug trafficking, sale of illicit liquor and child-prostitution. STAR TV telecast an entire feature on the group's work in the area.

Pandies' work with Children

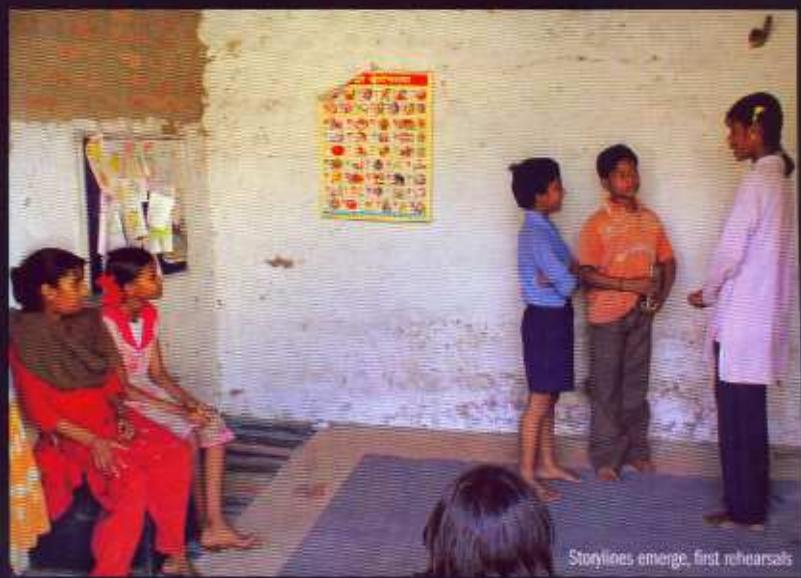
Of late, Pandies' has explored a plethora of childrens issues in their work. Projects have involved children from railway platform schools, juvenile homes and jails. In 2001, British Council (Delhi) did an extensive program on children's rights covering Delhi, Punjab, Haryana, and Jammu. The program involved 200+ schools and NGOs, at least 5,000 children. The theatre



Discussions lead the process



Identifying, sharing stories



Storylines emerge, first rehearsals

WHAT ONE CAN'T, OR
DOESN'T WANT
TO TALK ABOUT IN
SOCIETY OR TO
A PSYCHIATRIST,
CAN BE EXPRESSED
THROUGH THEATRE.

component of this program, handled by Pandies, spanned about 15 months. The project focused on children of displaced communities (Hindu, Muslim and Sikh) from Jammu, Srinagar and Delhi. In Pandies' workshops, children made their own play, from start to finish - ideating, consolidating diverse ideas in a coherent storyline, resolving creative conflicts, rehearsals, final performance. The role of Pandies' volunteers was (*as in all their workshops*) to scaffold the process rather than lead it. Unsurprisingly, children dealt with dark, prickly themes - communalism, violence, their own plight as children caught in the crossfire. The project culminated in a two-day festival of plays in April 2002, where select pieces from the different venues were performed.

Shares Kumar, "That children are *very* political has been one of my biggest realisations. They *like* abstracts, they are not scared of abstract issues, they are very willing to share and talk about them. We give the child a space to think and talk about herself, not just in an individual way, but in a political way as well."

He recalls a particularly moving session with a mixed group of Kashmiri Muslim and Kashmiri Pandit children in a workshop in Jammu. Sparks flew between the two 'sets' of children initially, and 'story ideas' resulted in hurt feelings and squabbles that reflected the prejudices and conditioning of adults in the community. As days went by, though, the children began to work through their differences - with a little gentle guidance from the Pandies' crew. Discussions followed, in which an attempt was made to see the other side of the story. Should the villain of the story be a Muslim or not? Should he be an '*ugravadi*' (*militant*) or should he be a more neutral 'dacoit' instead? Should the physically-challenged female protagonist investigate the 'problem' or should the menfolk take over?

"The ending was unanimously agreed upon," smiles Kumar, 'instead of victory and defeat, the play concluded with one community vowing to look after the grieving members of the other community."

The Children of Nithari Village

Pandies' started working with underprivileged children of Nithari in 2006, six months before the village hit national headlines and notoriety. The workshops were geared along the usual lines of sensitising children to issues of gender, religion and class, but the discovery of carcasses and skeletons of children who had disappeared brought about a decisive change in path. The families of many participants were involved.

"What one can't, or doesn't want to talk about in society or to a psychiatrist, can be expressed through theatre," avers Kumar. Pandies' responded to the situation by creating a group of young people who had narrowly missed similar fate and those who had lost their siblings. Articulation was difficult, and the first workshop was greeted with silence.

The group agreed to make a 'machine' - gestures, movements, sounds, but no words. The machine that the children created was repetitive acts comprising seduction, abuse, murder, cutting the body and then corruption and acquittal. After three workshops resulting in an oral narrative, one machine and two brief skits (*all dealing with the trauma*) the participants had regained confidence to return with redoubled vigour to their workshops - to make their contributions to issues of gender, class, caste and religion.

Working with Platform Children

One of Pandies' most overwhelming interactions has been with children who live on railway platforms. A recent workshop had over twenty children from the three platforms of Delhi - all of them victims of substance abuse and sexual exploitation, many of them reluctant to leave the platform for vocational training, because they would be better paid for sexual favours rendered in the toilet of some major trains.

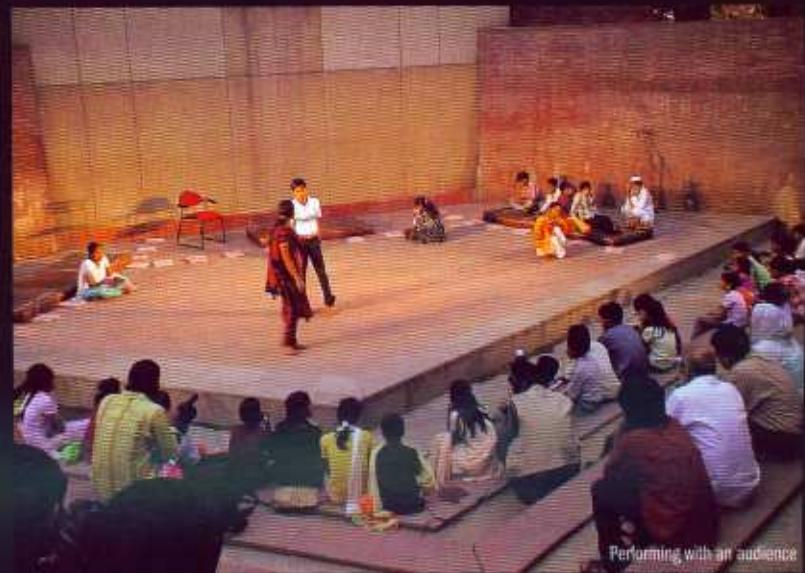
"The children had lived through the kind of experiences you really don't want a child to have. And they are so candid, so willing to talk about it," says Kumar. At the end of the session, four skits emerged. One on home life, three on platform life - one ending in hope, the others in uncertainty. Travails and desires were highlighted. "The exchange was so intense," Kumar admits, 'volunteers are still recovering from the emotional upheaval it left in its wake."

"Most children living on platforms are migrants. Some are runaways and get sent back home. I never know if I will see the same children the next time I go back," rues Kumar. He recalls a time when he told a group that he would see them again soon. After a long pause, one child spoke up, "*Promise mat karna. Aana, fir baat karenge. Bahut promise kartey hain log.*" (*Don't make promises. Just come, then we will talk. People make too many promises.*) This is a promise that Pandies' makes sure it will keep. □

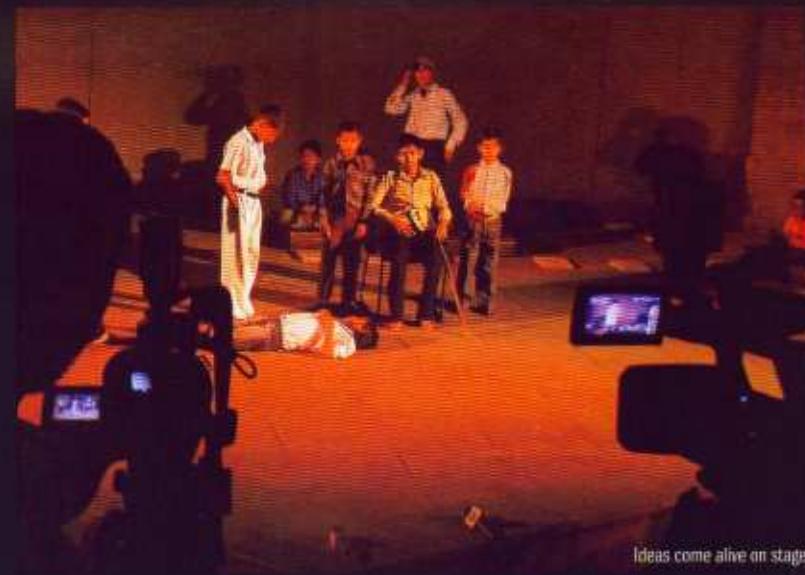
TO CONTACT PANDIES' WRITE TO: SANJAY.PANDIES@GMAIL.COM



Polished scripts get their first hearing

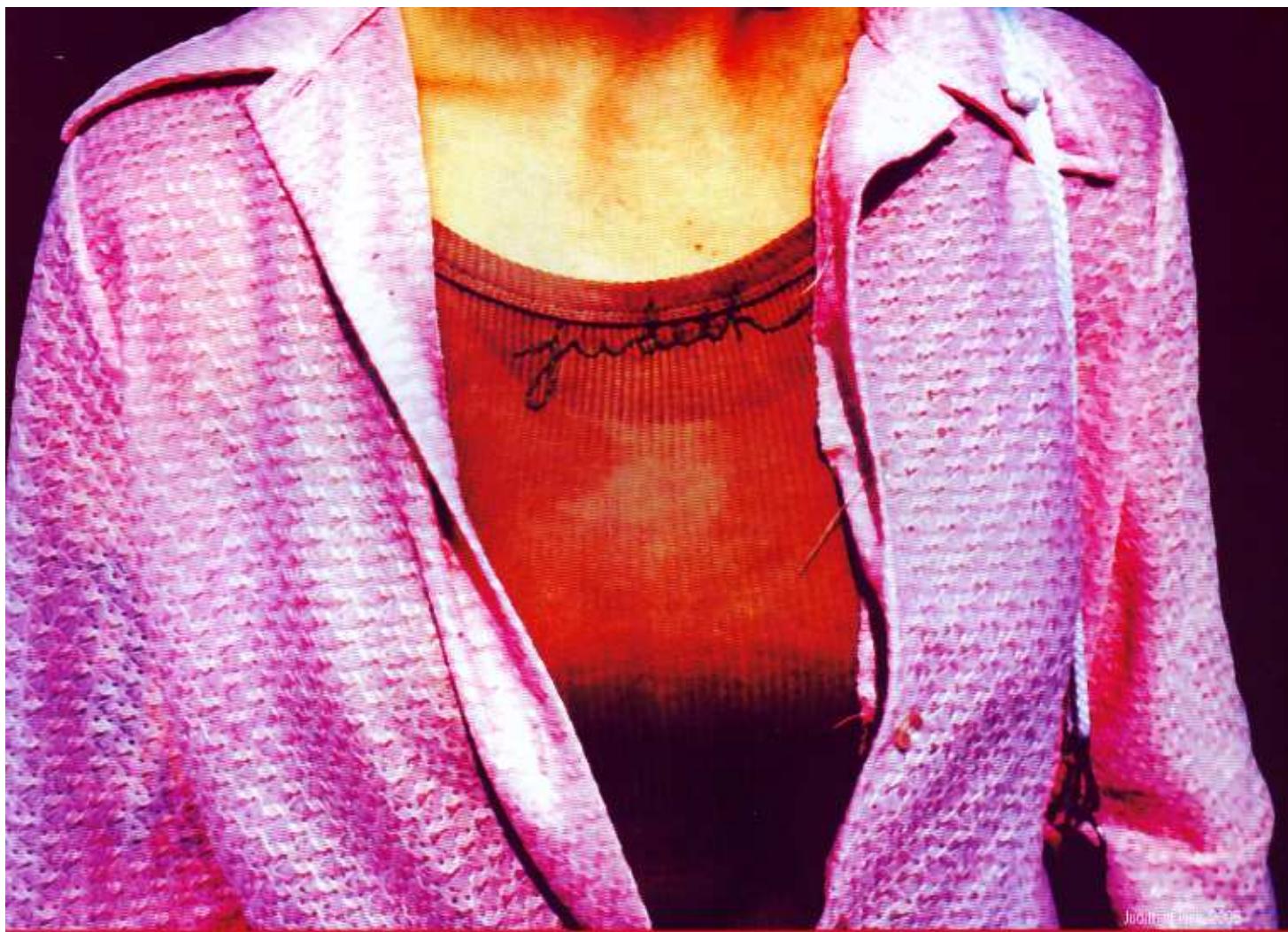


Performing with an audience



Ideas come alive on stage

WE DO NOT GO
WITH PRECONCEIVED
IDEAS ABOUT WHAT A
WORKSHOP IS GOING
TO DELIVER. WE LET
THE SITUATION LEAD
THE WAY.



© 2002 Sara Seinberg

Everybody has a Story

'And, at the end of the day, it may very well be the most important thing we all have to relate to each other,' says writer and photographer Sara Seinberg. Sometimes her stories are in pictures, sometimes in written words. All her stories are straight from the heart. She tells *Mindfields* about how she takes memorable pictures with an unfussy camera lens.

TEXT AND PHOTOGRAPHS: SARA SEINBERG

I began writing many years ago as a devout believer in 'the story'. Well, wouldn't you know it, that along about 1996, I arrived on my path at a sizeable pothole, the myth of writer's block. Not knowing yet that it was but a myth with dull fangs, I sank into its jaws and let the sadness of it wash over me. As with most stagnant self-imposed prisons, this became deeply boring. I was visiting my parents in Colorado at the time - a dry, beautiful, blue place with Nordic puffs in the sky and Flatiron hunks of rock sketching a skyline.



Flight, 2004

Walking with my father one morning, I felt compelled to capture something, but too afraid to write. I realized something about what moved me, a nameless thing, that could perhaps be captured in film instead of with the written word.

There has always been something about the way colours collide in the world that brings a tremor to a place beside my collarbones. Just right there, below the throat where breath lives, I will behold a midnight blue coyly rubbing elbows with a mountainous taupe, and a kind of emotion will whack me in a way I could never find words for, a new kind of story I could tell with different tools. I went home to look for a camera and my father loaned me his.

My first real tool of the trade was a 35mm Nikromat by Nikon, a workhorse of a thing. The body of the machine was heavy and metal, designed for war correspondents and rough-riders. Me? Well, I was a waitress at the time, so the cost-free aspect of it worked out really well for me. At the time, and more often than not since then, economics have shaped my work as much as anything else. My father eventually got into digital work and handed off the hunky gizmo for good, so I still have the old gal, trusty and perfect, and I pull her off the

shelf every once in awhile when I want some kind of simplicity. You'd think automatic things might feel simpler, but the lights and gadgets are too much for me sometimes.

I spent a few years with that camera, getting to know it, getting to know photography itself, and getting to understand what might serve my desires attaining certain ways I liked things to look. The combination of its weight and my feeling of wanting a camera with me at all times moved me to purchase a new tool around 1998.

I quit smoking and saved all the money I would have spent on cigarettes. Shockingly, I had enough funds to buy a new camera within **two months**. I got an Olympus Epic Stylus for about \$100, a purse sized aim-and-shoot automatic with very few manual options, and bought all kinds of outdated film.



Before the days where digital photography options were affordable for the mass market, bargains on expired film at photography stores camped in buckets in



Pepper, 2006

the dark corners or behind counters. I always asked the workers at the shops for the outdated film. Professional photographers weren't interested in the film because the quality of the output could not be guaranteed. Film could carry exposed leaks over time, stripes through the negatives, or color inconsistencies. Because I was still learning, it was more important to me to keep shooting than to have perfect tools. I tried to keep photography as cheap as I could, and in the process discovered that I liked the unpredictability my limits provided.

I toted my little camera with me everywhere, shooting my life: friends playing drums, neighborhood sidewalks, city detritus, the lovely pack of humans I ran around with. I kept telling my story in some way I understood it, some way that simple text couldn't provide. **More colours collided, angles of buildings sang in the sky, stray locks of punk hair fell over arched eyebrows, graffiti spelled out private things in public places, ladies fell in love in hard fast corners, while flowers refused to stop blooming, and paint peeled off gasoline cans. I shot fast. I shot in color. I paid little attention to 'rules'.** One happy accident that had a huge impact on my work had

to do with the aforementioned bargain film. After accumulating piles of the stuff, I got into the habit of reaching into the bag and shooting whatever film I grabbed. One day I grabbed some weird canister with a label I didn't recognize. Not being a lady who aims her attention to detail in that particular direction, I simply noted the film speed and set off shooting. On completing the roll of film, I handed it over to the folks at the photo place, who also didn't appear to check anything out. The nice man simply filled out my paperwork and processed the film as one might process any color film. I went back three hours later to pick up the prints and the results were so far beyond any expectation I could have possibly had.

The film was actually slide film, meant to be processed as positive imagery as opposed to negative. When that particular emulsion is processed in 'wrong' chemicals, the result is a total explosion of strange color. The photographs looked like outtakes from dreams. I loved them. I did some research and found the effect is not an uncommon accident people had come to adore. It was called 'cross processing'.

The technique actually messes up the chemicals in the machines that photo labs use, so they don't particularly like to do it. Some professional labs will do it for an



Sushi and Sweat, 2007

extra cost at the end of the day so those rolls are the last ones in the mix. They then empty the machine for the next day as usual and refill it with clean fluid for the following day's storytellers. My accident cost more money in professional places, but I found that at one-hour photo labs, if I just handed the stuff over and said nothing, it was business as usual.

My little companion traveled with me everywhere. I shot so much film. Again, my wallet continued to dictate the path I took with my work. **I slowly learned what kind of imagery I was drawn to, what kinds of stories I wanted to tell, and how my tools either limited my ability to do that, or provided me with structure to work within.** For instance, because I had no funding to set up elaborate lighting schemes, I learned not to compare my work with photographers who worked in studios. It just so happened that while I found some studio work moving and beautiful, it never pulled at my guts to work toward that arena. I used my gut as my guide.

There are so many avenues one can take in the world of image making, I found it helpful to narrow my scope and go slowly. The economic commitment to the medium

can be so intense, it became paramount for me to really investigate where my heart lay before I invested in expensive equipment. And because I wasn't in school at the time, **I didn't have access to color printing, strobes, large format cameras, or other bells and whistles that can be so seductive in the creation of a beautiful photograph.**

Still, after so much self-study, so many photographs, I continued to feel a certain pull for more: more knowledge, more access, more immersion. I wanted to see my images through from start to finish. I wanted to make big glamorous prints all by myself. I wanted to know how to make tiny triptychs and blurred landscapes on matte paper the corner store didn't have. I wanted to live in the darkroom. So I took the plunge and headed to art school in the cold provincial east coast town of Boston.

I loved the darkroom. And when I say 'love', it feels a strange trip of only four letters to cover such an affair. I loved the smell of the toxic chemicals, I loved being in the dark alone with music spilling into the little room for only me, and I tapped my toes waiting for the prints to emerge from the machine, seeing if the color levels needed my attention: Too much cyan? Not enough red?



All the Pretty Things, 2007

And in the end, was it more important for me to transmit a 'reality' to tell my story, or did messing with the colors tell a truth that mattered more?

Alas, darkroom time in the real world is expensive, time ravenous, and difficult to come by. My move to New York City found me wandering in a forest I had vowed to avoid forever. Ha! 'Forever'. What a tricky little beast.

The streets of the city were blanketed with shutterbugs wielding tiny digital machines wired to laptops and printers. My time and financial situation made custom printing in a darkroom impossible. I gave in. I began shooting digital because I wanted to keep taking photographs. There was no film to invest in, editing could be done on the fly, and I learned to make photography cheaper than ever.

As life in the city happened to me, as life will do, my view began to change. I could read this in my pictures as the frames, usually cramped with exploding details, got emptier and emptier. In

Photoshop, I began to even empty out color from the photographs, look for stories in contrast and grey rather than in collisions of color. The new images meditated on things rather than rioting around them.

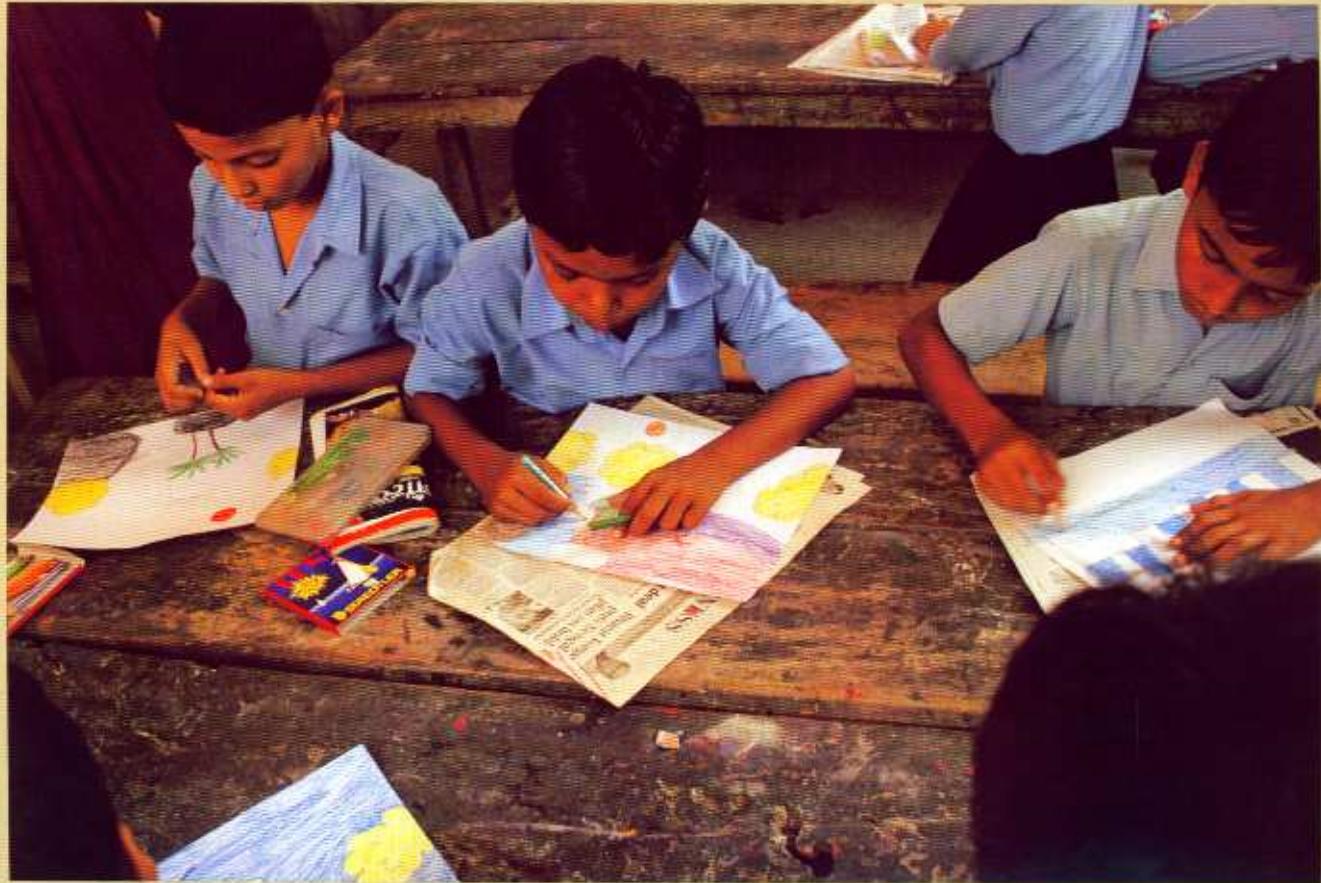
And so here I am today, perched on the brink of a new solo show, a digital feast in matte paper and sly colors. In some cases, no colors. But the guiding place from which to shoot is the same, no matter what the tools or the city, the subjects or the funding. I check my story. I breathe in. I check my collarbones and see if I feel a lifting to flight. □

SARA SEINBERG

is a writer, editor, curator and photographer living in San Francisco. She has put her MFA from Tufts University to phenomenal use by working very happily in a worker-owned grocery collective.

Seinberg been widely published and collected internationally. She loves kosher pickles and hopes to visit India one day.





Education is not Filling a Bucket, but Lighting a Fire

In its structure, approach, methodology and philosophy too, the National Knowledge Commission (NKC) has been groundbreaking. It has compelled our country's elites to fundamentally rethink their assumptions about India's knowledge foundations and the steps we need to take next. As its three-year period draws to a close in 2008, Rohan Mukherjee brings us an NKC retrospective.

TEXT: ROHAN MUKHERJEE
PHOTOS: STUDIO UMBILICAL

Knowledge is an interesting commodity, economists would agree. Unlike other traded goods and services, it doesn't diminish as you pass it along. And neither does passing on your knowledge make you less knowledgeable. What's more, this transfer can actually increase the overall stock of knowledge - by planting new and brilliant idea seeds in the mind of the receiver!

An important thing happened in 2004, when Dr. Manmohan Singh took over as Prime Minister. Having shepherded our economy through the reforms of 1991 and having subsequently witnessed the virtual explosion of knowledge-based industries in telecom and IT, Singh realized the role

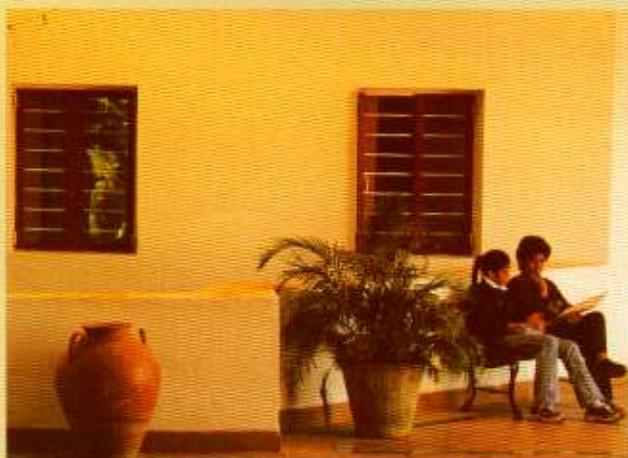
knowledge could play in pushing India to greater heights. An educator and an intellectual himself – he took it upon himself to make a difference.

The critical factor was not whether knowledge could help the Infosyses and Wipros improve their profit margins – they would do fine anyways. The *real* difference knowledge could make was in the lives of everyday Indians – through the application of new agricultural techniques, the computerization of public services, the growth of government-funded research, through innovative new methods of spreading of literacy. All this, and more, was the premise of the National Knowledge Commission (NKC), established in October 2005 for a period of three years.

The aim of the National Knowledge Commission was to take a long hard look at aspects and implications of India's future as a knowledge society – a society that effectively uses knowledge for development.

Comprising eight eminent personalities from Indian academia and industry, and headed by accomplished technocrat Sam Pitroda – the organization was billed as a “government think tank” that would advise the Prime Minister on knowledge-related issues.

What set the NKC apart from other government committees



Most government committees start their tenure with a legion of offices, secretaries, researchers, peons, drivers, etc. and end it with a voluminous report that is difficult to read, interpret or act upon. The end result is hundreds of pages of recommendations sitting on shelves collecting dust in the back offices of India's labyrinthine bureaucratic system.

The NKC, on the other hand, chose to deliver its recommendations not as a final compendium but as brief letters with actionable bullet points at regular

intervals throughout its tenure. This was a refreshing change that allowed the Prime Minister to give his attention to each aspect of the knowledge paradigm individually and then think about ways of implementing the most desirable recommendations.

Also, having been set up as an institution outside the traditional bureaucracy, the NKC had unparalleled access to the corridors of power, particularly the Prime Minister's Office (PMO), the Planning Commission and the Ministry for Human Resource Development (MHRD). Internally, it was structured as a decentralized, flat and “virtual” organization – innovations of its chairman Pitroda. The members of the Commission worked in a decentralized manner, operating from their own institutional bases but meeting regularly. Research and administration was entrusted to a core group of young analysts in New Delhi.

The internal structure of the NKC resulted in a dynamic, lean organization that was quick and efficient in following its mandate. The organization's methodology relied on small working groups of experts in each domain, who were responsible for conducting internal deliberations and wider consultations before arriving at specific recommendations for reform in their respective areas. Once recommendations were submitted to the NKC, it would debate them internally and arrive at a final set of recommendations, which it would send to the Prime Minister.

Varied areas of focus

The areas of focus for the NKC covered a wide range of knowledge-related topics. These included literacy, libraries, translation, all types and levels of education, science and technology, intellectual property rights, innovation, entrepreneurship, agricultural research, e-governance and even the preservation of traditional and indigenous forms of knowledge.

In its recommendations in these areas, the NKC has demonstrated vision and far-sightedness normally lacking in a *sarkari* point of view. The efforts have not gone unnoticed by the media either. Many NKC suggestions are in the process of implementation by various government ministries and agencies. In his 2008 Budget speech, Finance Minister P. Chidambaram indicated that many of the NKC's recommendations have been incorporated into the Planning Commission's XIth Five-Year Plan (2007-2012). In addition, on the advice of the NKC, the Budget allocated Rs. 100 crore for the development of a broadband network between educational and research institutions in India.

NKC and School Education



In the domain of school education, the NKC conducted a national workshop in New Delhi in July 2006, followed by regional workshops in Lucknow, Bangalore, Kolkata, Guwahati and Pune. These workshops involved interactions with teachers and principals, personnel from District Institutes of Education and Training (DIET), State Councils of Educational Research and Training (SCERT), officials from state departments of education, Sarva Shiksha Abhiyan (SSA), as well as NGOs and relevant civil society representatives. Important issues arising in these forums include patterns of State and Central government expenditure on school education, autonomy for local authorities in administering school education, universal access to schooling, and reforms in teaching techniques, curriculum development and teacher education.

In each of its consultations the NKC has focused on the broad themes of quantity, quality, access and management pertaining to school education. While important issues have been thrown up by these discussions, the NKC's official stance on school education remains to be seen since it has not yet issued recommendations on the subject to the Prime Minister.

Recommendations have however been submitted on the model Right to Education Bill circulated by the Central government to State Education Departments. The NKC has come out strongly in support of the Right to Education as a fundamental constitutional right and has stressed that this right must not be left to state governments to implement but instead requires a central legislation and a substantial financial commitment from the Central government. It has highlighted the importance of having a set of norms and standards by which a minimum quality of school

education may be set down for state authorities and education systems to follow.

There is also a special focus on children of the disadvantaged, landless and minority communities. The overall recommendations of the NKC on this Bill are progressive and have laid the responsibility of ensuring universal quality education, itself a necessary condition for national development that benefits all sections of society, squarely on the shoulders of the Central government.

While this is a bold move, the feasibility of the recommendations is open to question, especially since the Constitution of India designates education as a subject falling under the powers of State governments.

Starting a dialogue about school education in India

What NKC has unarguably managed to do is start a discourse on school education in India. It has recognized the importance of securing the lower levels of India's educational pyramid (i.e. primary and secondary) to strengthen the future human resources of the Indian economy. Extensive interactions with stakeholders in the schooling system have brought about a refined understanding of the sensitive issues at hand. Inputs have been gathered not just from experts in its working groups, but also from citizens who are interested in education. The NKC website has hosted lively discussions on knowledge-related issues, and the Commission acknowledges and responds to most communications relevant to its work. All this has built a sound grassroots presence while dealing with national-level issues.

NKC's contribution to redefining the way we think about the contribution of knowledge to development has been acknowledged widely not just in India but also around the world, with countries like Sri Lanka and Mexico now toying with the idea of establishing their own Knowledge Commissions. As its term comes to a close this year, the legacy of the NKC and its recommendations will be felt for many years to come. □



ROHAN MUKHERJEE

Has a degree in Philosophy, Politics and Economics from Oxford University and is currently a student of Public Affairs at Princeton University. Has spent time working with an activist NGO in rural Odisha, researching public policy in New Delhi, working for the government of India, and coordinating the construction of HIV clinics in Africa.

ARVIND GUPTA: SCIENTIST TURNED TOYMAKER

TEXT: AMRUTA PATIL
PHOTOS: LUKE HAOKIP

It's an unrelentingly hot summer day in Pune. Arvind Gupta's space in Pune University's IUCAA campus looks like a laboratory from a Roald Dahl story. A hydraulic crane made of disposable syringes and saline tubes, a water squirter made of a drinking straw, a periscope made of pencil boxes, a levitating pencil, puppets that climb on a wall. And these are the inhabitants of a single shelf in this colourful, crowded room.

Toymaker, writer, scientist, engineer and bibliophile - Gupta wears epithets with disarming humility. Dressed in a lavender khadi kurta and brown corduroys, carrying his famous 'toy bag'. Anyone who has met him has doubtlessly noticed this Army surplus canvas bag, filled to bursting point with every manner of odds and ends. Things that most of us would discard as junk - discarded wool and buttons, used straws, matchboxes, rubber slipper soles, pencil stubs, empty ballpoint pen refills. The bag has traveled with him to over 1500 schools and 20 countries.

Arvind Gupta moves continuously. There is rarely a still photograph to be had. When he pauses, it is to pull out an interesting newspaper cutting, or carry out a quick demo - make a tone-changing flute, for example. His toymaking is always accompanied by riveting stories about people, about the world around us, about science. His official job at the Muktangan Vigyan

Shodhika is to figure out ways to make science irresistible to children via low cost science toys that they can make on their own. Another ongoing effort is to make educational books and resources freely available online and to translate books on education into various Indian languages. Here are excerpts of our conversation.

TELL US ABOUT LIFE BEFORE YOUR CURRENT AVATAR AS CHIEF TOYMAKER...

AG: I come from Bareilly in Uttar Pradesh. Thanks to a very supportive family, I had the luxury of a good school education, and went to IIT Kanpur after that. I joined Telco, Pune, in 1975 - when I was twenty two years old. Telco was a great place to work - I cherish the experience - but I got tired of making trucks. I went on to work with the Hoshangabad Science Teaching Program; and then the UGC, NCERT, National Book Trust and other organisations for the popularisation of science, taught at Mirambika Free Progress School (Delhi). I moved back to Pune four years ago with my wife Sunita. She teaches Sociology at Fergusson college.

WHO HAVE BEEN YOUR PERSONAL HEROES?

AG: While I was still at Telco, I took a break and worked for six months with Laurie Baker - my college





A young enthusiast is introduced to the hydraulic crane powered by syringes and saline solution.

day icon. Unlike most architects who spit on tradition, Laurie's work was always in harmony with it.

He used to say, "When you look at a village house, look at it with humility and respect - you probably can't improve upon it with all your knowledge, because it has come from a thousand years of R&D. It has emerged out of the needs of the people, out of materials available to them, it has sheltered them for centuries."

Another thing about Laurie Baker, he was a man of such humour - most people in the social sector look like they are carrying the weight of the world on their shoulders! Baker is definitely one of the greatest human beings I have met.

(AT THE MUKTANGAN VIGYAN SHODHIKA)
WE DO NOT DEAL WITH CURRICULUMS. WE
DEAL WITH IDEAS. SHOWING POSSIBILITIES
WITH SIMPLE MATERIAL IN OUR OWN LIVES.
IF YOU CANNOT MANAGE THAT, YOU
SHOULD QUIT SCIENCE.

HOW DID MUKTANGAN VIGYAN SHODHIKA START?

AG: Prof. Jayant Narlikar of IUCAA invited me to start working with the science centre here as a visiting scientist. Muktangan Vigyan Shodhika was funded by the legendary Marathi writer, PL Deshpande - a friend of Prof. Narlikar's from his Cambridge days. I was not immediately ready, but realised that a loner cannot do too much. Being with a small group empowers you. So I mulled over Prof. Narlikar's proposal and eventually decided to join.

I must say that I now have the best team one could ask for. Vidula (Mhaiskar) is a microbiologist by training, she worked at Stanford for four years. Ashok (Rupner) comes from the village Surodi - his parents work on the fields, and he was the first child in his village to get an MSc. Together, we've found an inspired corner in this organisation.

A lot of our work is backward integration. Great work has been done by people across the world. Our job is to make it simple, make it do-able with common materials that you'd find all around you. Even the simplest raw material has the potential to open up possibilities, open up your mind.

MOST PEOPLE IN THE SOCIAL SECTOR LOOK LIKE THEY ARE CARRYING THE WEIGHT OF THE WORLD ON THEIR SHOULDERS.

We conduct hands-on workshops for children. We have conducted two hundred of them this year. All our workshops are free - the only thing children need to bring along is newspapers and a pair of scissors. They take back whatever they make. Students of Municipal schools and girl students are given priority.

We have just one mission - to get the gleam back into a child's eyes. We do not deal with curriculums here. We deal with ideas. Showing possibilities with simple material in our own lives. If you cannot manage that, you should quit science.

WHAT ABOUT THE ROLE OF SCIENCE CENTRES ACROSS THE COUNTRY?

AG: Most science centres, sadly, thrive on making simple things difficult. People import all sort of ideas and apparatus, but do not look at their own backyards for ideas or material. Guards with batons patrol these centres - intimidating children instead of inviting them to explore.

Science centres seem designed to intimidate. The signal they sent to children is - "You don't have these lasers and fancy shining instruments, so what will *you* be able to do?" You should be able to say to a child, "Go and pick up an empty matchbox or Frooti pack, I'll teach you how to make things".

Children have such dexterous fingers - that is why this experimenting, playing and making of toys works well with them. They *like* playing with things that they have made themselves.

DO HANDMADE TOYS MANAGE TO HOLD THEIR APPEAL IN A WORLD FILLED WITH SLICK READYMADE TOYS?

AG: Parents are constantly telling their children to be careful with their toys - not to break them. So much so, that I know of a child who kept aside the expensive doll that came out of a box, and started playing with the box instead. With the box, she had no fear of being admonished. She could imagine the box to be whatever she wanted it to be - not so with the doll who already came with a name, a face and readymade accessories. (*Laughs*) I firmly believe that the best thing a child can



Levitating pencil, and some of the books Arvind has written.

do with a toy is break it.

Why does a child want to break a toy? Because she wants to see "*Iskey pet mein kya hai?*" (What's in its stomach?) Unless she satiates this curiously she isn't satisfied. Children are eternal discoverers. Good toys must *invite* dissection. If the dissection goes 'wrong' or the toy cannot be fixed again - the heavens are not going to fall!

WHAT WORK HAVE YOU DONE WITH MOBILISING EDUCATIONAL RESOURCES AND BOOKS...

Such tiny countries around the world have done such path breaking work with books and translations. But we have to the tune of 40 crore Hindi-speaking people, for example, that have no good reading material in their mother tongue. There is such paucity of good resources. In a population of more than one billion

WHY DOES A CHILD WANT TO BREAK A TOY?
BECAUSE SHE WANTS TO SEE "*ISKEY PET MEIN KYA HAI?*" (WHAT'S IN ITS STOMACH?) GOOD TOYS MUST *INVITE* DISSECTION.



A tantalising tabletop invites you to get your hands dirty

people – there are next to no decent public libraries. An organization that has printed over a thousand science books in Malayalam once invited me to one of their book exhibitions. Their books are meant for lay people. When I saw the publications, I told them "I don't like the books you print – these are not good books." They said, "Since you are so critical – why don't YOU do some books for us?" I told them that I would.

This was in 1998, around the time of the Pokhran blast.

I am a very positive person most of the time. People say I always rub a bit of my enthusiasm onto them. But the Pokhran matter got me very depressed. I looked round and there seemed to be no anti-war books in this country. It was then that I came across a Japanese story called 'Sadako and the Thousand Cranes' – a true story about a girl named Sadako Sasaki, who was diagnosed with leukemia as aftermath of the bomb dropped on nearby Hiroshima

when she was two year old. Sadako heard of a legend that making paper peace cranes would grant her a wish. She made a thousand cranes with the hope that she would get better again. Sadako died at the age of twelve. The story brought tears to my eyes. I knew I had to translate it. We now have 10 -12 such anti-war books, amongst hundreds of other translated titles in print and online.

YOU HAVE LABOURED TO CREATE AN IMMENSE STOREHOUSE OF RESOURCES ON YOUR WEBSITE...

THERE ARE SO MANY INSPIRED TEACHERS IN THE UNLIKELY PLACES. DESPITE TEACHER TRAINING AND TEACHER SELECTION METHODS, NO SCHOOL HAS A MONOPOLY OVER GOOD TEACHERS. AND THESE TEACHERS STRUGGLE AGAINST SUCH ODDS AND STILL END UP DOING A GREAT JOB.

We share 99.9% of our genes with the rest of humanity. The genome project has demonstrated this. All racist theories of white versus black versus brown have been thrown out of the window. If people only had a chance - they would be as good as anyone else.

Our people are as good or as bad as anyone anywhere in the world. There are so many inspired teachers in the unlikeliest places.

THE RESPONSE OF CIVIL SOCIETY
SHOULD BE TO SHARE. NOT FOR MONEY,
BUT FOR THE LOVE OF SHARING.

Despite teacher training and teacher selection methods, no school has a monopoly over good teachers, they're randomly distributed. And these teachers struggle against such odds - and still end up doing a great job. Tilak had said ' Swaraj is my birthright, and I will have it' - I have similar views on the sharing of knowledge. Copyrights were made in the caveman's era - I am copyleft in that regard. (Laughs) There are books that have been out of print for years - you couldn't buy them in a store if you wanted to. Someone would be doing everyone a favour by digitizing these and making them available again. The whole act of computers is about cutting, pasting, *sharing*. One of the good things APJ Abdul Kalam did in his tenure in the Rashtrapati Bhavan was that he got almost 25,000 books digitized.

Pune is supposed to be the Oxford of the East - but if you walk into any big bookstore, all you will find are ABC guides and management trash. Where is that gem on education that you are looking for? And if this is the state in cities, what are the people who are in smaller towns and villages supposed to do? The need to share knowledge is enormous.

The response of civil society should be to *share*. Not for money, but for the *love* of sharing. Whatever I do is a small effort towards doing just that. □

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Arvind Gupta has written several books which have been published by the Eklavya Educational Society and National Book Trust, amongst others. *Little Toys*, *Ten Little Fingers*, *String Games*, *Matchstick Models and Other Science Experiments*, *Pumps from the Dump*, *The Toy Bag*, *Toy Treasures* are some of his most acclaimed books. Many of these books have been translated and printed in various Indian languages.

WWW.ARVINDGUPTATOYS.COM has downloadable resources on education philosophy, science, toymaking etc.



Gupta's famous canvas toy bag

"For any of us who grew up with dry pedants teaching us science, the excitement and frolic of science just completely passed us by. People like Arvind Gupta are a perfect antidote to that. He is animated with the joy of discovery, illuminated by his delight at fashioning stuff out of junk. Best of all, he's the consummate communicator. I've seen him with 7-year-olds, and with graduate engineers, and one thing was alike. All of them were lit up by his energy and enthusiasm. The other day, he packed in a lecture hall at IIT, no standing room, and he had them mesmerised. As an adult, spend an hour with him, and you start to see new possibilities on how science can be, and should be, taught. Imagine how wonderful it is to be a child and spend time with this genial science wizard! I hope to follow his lead in my own science work with children."

SRIDHAR RAJAN,
Volunteer, Mirambika Free Progress School



Count Me In!

From Integration to Inclusion

Nearly 20% of school-going children in India experience learning difficulties. Dealing with a special child isn't rocket science, but it certainly calls for an open mind and the will to include. Are our classrooms equipped?

TEXT: RIMA CHIBB
PHOTOS: STUDIO UMBILICAL

The story of Ishaan - the protagonist of *Taare Zameen Par* - has urged the teaching community in India to revisit their perceptions about children and question parental expectation. It couldn't have happened at a better time. According to Learning Matters India, an NGO offering remediation services to children with learning difficulties, nearly 20% of school-going children in India experience learning difficulties. Sometimes symptoms are hard to detect in early years, but as the child grows up, this can lead to a massive struggle with basic academics; spoken and expressive language; in reading social cues, which may hinder their ability to make lasting friendships.

Early Intervention Services and Diagnostic Centres have started mushrooming in Indian metros. A child grows up under the watchful eye of a plethora of medical professionals, parents and grandparents - all of whom give their expert opinions on each milestone. By the time the child starts going to school, even a minor deviation in behavioural pattern will ensure that she is labelled and declared unfit for regular schooling.

Which brings us to the moot question - Is the child unfit for schooling as it exists, or are our schools unfit for the child? Many schools cite reasons why they cannot take on a child with learning disabilities - they are unprepared, ill equipped, lack specialised staff. All valid reasons, incidentally, so most schools give up even before they can start.

We have a law wherein the government is committed to provide education for children with disabilities in integrated (normal) or special schools - The Persons with Disabilities (Equal Opportunities, Protection of Rights & Full Participation) Act, 1995. Furthermore, being a signatory to the UN Convention on the Rights of Persons with Disabilities, India is also committed to providing quality inclusive education at primary and secondary education levels (Article 24). The spirit of the law hasn't been internalised in most of our 'mainstream' schools, though. There is lack of clarity amongst most stakeholders regarding the meaning of 'integration' and 'inclusion'. As a result the terms are used loosely and interchangeably, further compounding the problem.

The Difference between 'Integration' and 'Inclusion'

Most schools start with 'integrating' children with special needs into their system of education only if the child can cope up with it. In this situation, the schooling system remains undisturbed and unchanged, as it accepts a child who has the strengths that allow her to function in a mainstream class. So if a child can cope with age-appropriate levels of Maths, she attends Maths class with other children. For a 'problem' area like English or Science, she learns in a small group setting where she gets individualised attention.

A school becomes truly 'inclusive' when the learning needs of the child are tackled in a mainstream setting. Or when the school *redesigns* its system to accommodate the needs of 'special' children *alongside* those of the so-called 'normal' children, to provide maximum schooling experience. Here, teachers are supported by special educators who address all learning issues within the class itself.

Some of the action points include - buddy system, adapted curriculum, creative curriculum delivery, innovative evaluation methods, vetting text books from a disability viewpoint, writers and scribes, audio



libraries, and introducing Sign Language and Braille as a second language for all children. Advocacy initiatives include workshops for parents of 'normal' children about the rights and needs of special children and how an inclusive environment benefits both as it addresses the needs of all learners.

BY THE TIME THE CHILD STARTS GOING TO SCHOOL, EVEN A MINOR DEVIATION IN BEHAVIORAL PATTERN WILL ENSURE THAT SHE IS LABELLED AND DECLARED UNFIT FOR REGULAR SCHOOLING.

Carole Paul - Consultant Trainer, Special Education, with Step By Step School, Noida - advocates frequent teacher sensitisation and training to help a mainstream teacher gain confidence in handling children with special needs. Says Paul, "It's not rocket science, but it certainly asks for an open mind and the will to include. All children learn differently, some need more time and patience. Teachers need the tools for working with special children". After attending an initial sensitisation

workshop (spread over a period of two months), Paul feels that teachers become more aware of children with learning difficulties, and display a positive attitude while working with them. They feel more empowered to reach out.

Special educators agree that it is far easier to handle one or two children with identified needs in a regular classroom, rather than having six or seven kids with different needs clubbed together in a 'special needs' class. Here, the mainstream teacher needs to be equipped with strategies to address the needs of such learners.

Individualised Educational Plans (IEP) are prepared by the special educator in consultation with parents and psychologists, so that all the caregiver address common goals. IEP's detail out the strengths and concerns regarding a child, to enable an effective action plan. Proactive parents usually work in partnerships with teachers to achieve these goals.

Nomita Mehra of The Shri Ram School, Delhi, has three children in her class of twenty eight who need extra



attention. She believes that there are academic and non-academic benefits for every student in her class special or otherwise. "Overall it is a win-win for all my students," says Nomita. "All my students have different expectations of me as the class teacher, which I need to fulfill, so for me there is no difference." Since children love to feel important, the teacher can set the tone for an inclusive spirit in class by encouraging buddies who are eager to help, all the while gently reminding them not to overprotect their friends.

"I feel that inclusive education is a must for all children," says Megha Joshi. "I want both my children to be empathetic and accepting of all kinds of differences, instead of being ignorant or prejudiced. The inclusive model of education imparts certain humanitarian values which are very much a part of education per se."

Academically, concept reinforcement using multiple intelligences and application of innovative learning strategies benefits all learners. In such a class, the co-teacher (usually a special educator) who shadows the progress of specific children is viewed as a support as well as a resource, which becomes an added advantage for all children.

How well do you know your Students?

A typical class has a heterogeneous mix of children with individual learning styles. Through proper planning, differentiated instructions and classroom management (including effective seating), a teacher can look after the needs of the few children who need help, while ensuring that she does not deny the others their learning needs. This ensures that the learning curve is not compromised or slowed down.

"Our children are mainstream" says Dr. Manju Lal, mother of a child with special needs. She firmly believes that all schools should address their academic needs through inclusive processes - without fuss and as a way of life. World over, the advantages of inclusive

education are increasingly being recognised and accepted, and time and again it is proven that most children with learning issues can enjoy a fulfilled schooling experience if backed by genuine attempts to address their learning gaps. As they grow, confident and with their self esteem intact, these children can become significant contributors to the talent pool of their school. They shine if their calling is identified and nurtured.

Due to a lack of exemplary role models in the process of making this happen - well-meaning school principals in India are often stopped in their tracks by the 'How to Do It' aspect. The crux of the matter is, 'Do you *want* to open your doors? If the answer is 'Yes', then all it takes is a shift in attitude and paradigm to bring about a positive schooling experience for every learner, to include as many children as possible on the school map.

A few passionate, activist school managements and principals have taken the plunge, and their experience tells us that if schools really want to achieve integration or inclusion, the will to do it dominates. Roadblocks become merely procedural. Manika Sharma, Head of Special Needs Education Department at Delhi's The Shri Ram School, feels that for a school to become truly inclusive, not only do parents, teachers and students need to be oriented and trained - administrative and support staff need to be sensitised in equal measure. The ride towards inclusion/integration promises breakthroughs, innovation, creativity, capacity building, highs and lows, and immense satisfaction at the end of it all. Sometimes the solutions are right before us and do not require any major efforts.

Getting to the Brass Tacks - Here's what can be Done

Children with Orthopaedic Needs:

Children who are orthopaedically challenged need to be in regular classrooms, not in special schools. All that the school needs to ensure is that the child can get to class. The provision of wheelchairs, ramps, lifts and easy-access toilets can be planned if classes are not on the ground floor. Simple architectural considerations and retrofitting solutions would help if the school structure already exists. Beyond that, the child learns on his own!

Visually-Challenged Children:

How can we offer integrated schooling to a visually impaired child? C. D. Tamboli, Director, Education, National Association for Blind (NAB), Delhi, says, "If we equip her with pre-Braille reading and writing skills and necessary life skills right from preschool, a visually challenged child adjusts very well in a regular class. Many of our children have been toppers in their class."

All visually challenged children enrolled with NAB attend regular schools like the Kendriya Vidyalaya, Delhi Public School, Delhi Police Public School and Green Fields in the mornings, backed by school tutorials at NAB where specialised help in various subjects is provided to those needing it. This synergy has opened new vistas and has learnings for all.

NAB remains in regular contact with the schools by providing a special educator as a resource person. Back-up support is in the form of textbooks in Braille, large print and CDs. Special equipments for writing Braille, Mathematics and Geometry, tape recorders, Braille Watches, talking calculators, white canes, school bags, etc. are provided.

Hearing-Impaired Children:

The first thing to ascertain in the case of hearing impairment in a child is her oral capability. If a child uses hearing aids and knows sign language, learning becomes much easier because the brain is adequately wired to receive communication, and responds accordingly.

Teachers need to be equipped with simple strategies to reach out to this child along with other children. Effective strategies include - maintaining eye contact while giving instructions; avoiding facing the blackboard while talking, so that the child can lip read; and using a single language of instruction. Some amount of personal attention is required to ensure that the child has understood. Remedial back-up is also an option.

Children with Dyslexia, Autism, ADHD:

The largest group of special needs children include those with borderline autism, Attention Deficit Hyperactivity Disorder (ADHD) and dyslexia. They are found in each and every class and usually drop out of

school only because support is unavailable. With proper educational and psychological assessment and specialised support, such children develop necessary skills in reading, writing and maths to cope with academics. Such learning issues can be handled at the school itself by having a special educator and a counsellor on board.

"My son who is in Grade 5 has started performing at full potential in the mainstream class because of the timely help of the shadow teacher (doubling as a scribe) who assists him with reading 'difficult' words and 'complicated' spellings as and when he needs her," says Padma Kumar. The dip in self esteem, which was causing other behavioural issues in her son, is now a thing of the past. Such transitions do take place. Children predicted to have dismal school records with repeated failures can turn out to be assured and confident, and look forward to a bright future replete with success stories.

So what's in it for the Rest?

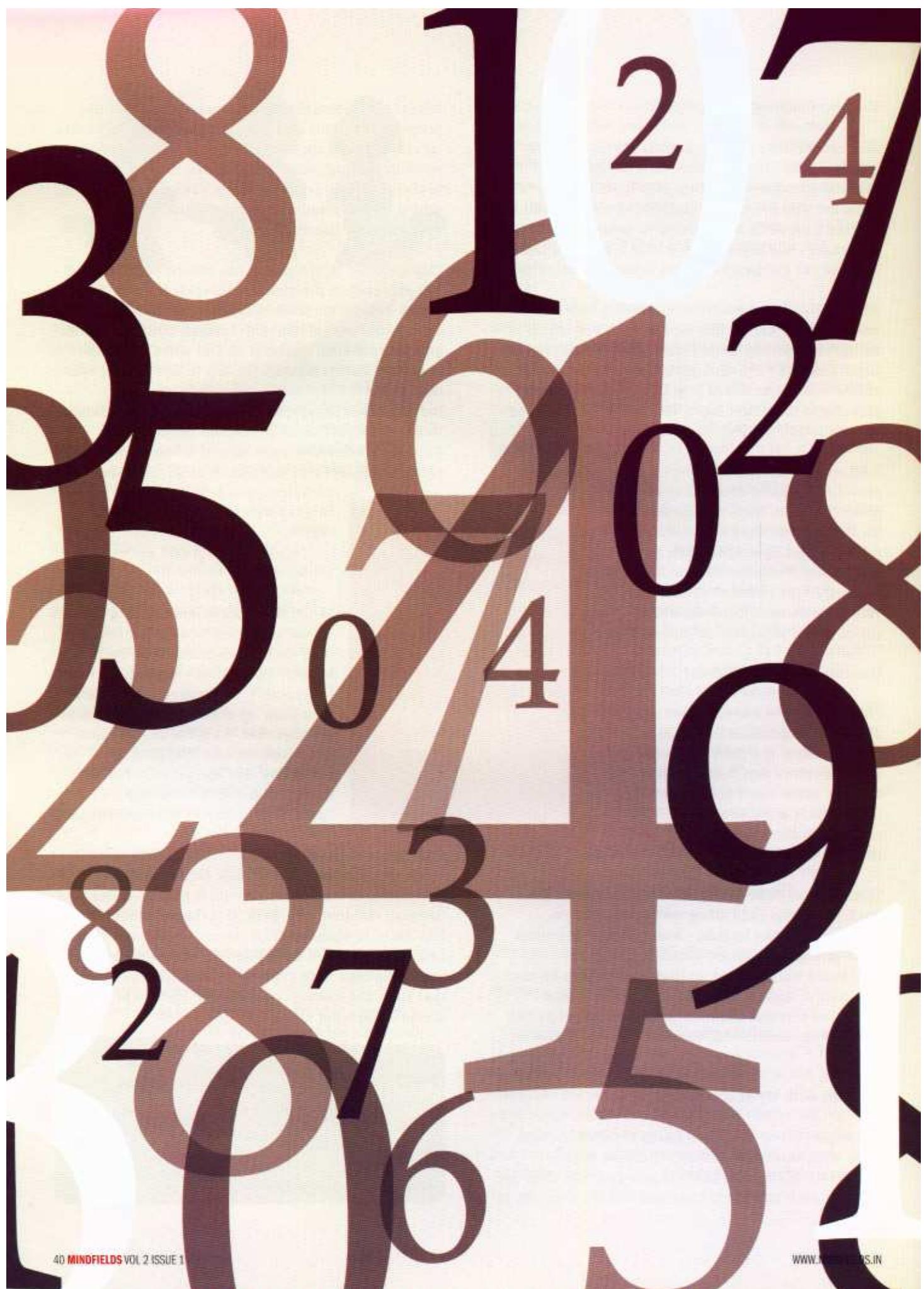
When these brave, enterprising schools devise strategies, bend rules, tweak their systems to embrace diversity and become egalitarian - what do they get in return? What happens to children who grow up with other children who are 'different' from them? They are sensitised, for one. The kind of sensitivity that cannot be achieved through a one-day workshop on 'International day of the handicapped'.

Children who grow up in a pluralist environment value that it is 'okay' to be non-conformist and different. Good news for parents is that so-called 'normal' children who went to inclusive schools are less likely to abandon their parents in old age, disease and need. They are more tolerant, accommodating and accepting. They grow up to understand the fact that each and every person has the *right* to be accepted for what she is. ☐

RIMA CHIBB

Is a filmmaker and development communicator. Has taken it upon herself to undo the all-pervasive 'dumbing down' brought in by the idiot box. Conducts creative expression workshops for youngsters and is fearlessly empathetic with those who have learning struggles. You can reach her at rima.chibb@yahoo.com





ONE TWO MANY

THE LANGUAGE OF MATHEMATICS

Modern science relies heavily on mathematical models of the world around us. Galileo, the Italian scientist and a father of modern science, declared that "The book of Nature is written in mathematical language." But what is this language, and where does it come from? Mohinish Shukla puts some ideas on the table.

TEXT: MOHINISH SHUKLA

ILLUSTRATION: STUDIO UMBILICAL

To most of us, mathematics is intimately tied to the manipulation of numbers - integers, reals, fractions, multiplication, logarithmic tables and so on. But soon we are also introduced to more complicated stuff - like algebra, calculus and trigonometry. We can think of these complications as structures that operate over numbers. For example, in algebra, $x=2x$ is just a short-hand way of writing the entire (very large!) set of pairs of numbers $\{(1,2), (2,4), (3,6) \dots\}$, where the second of each pair is twice the first. Similarly, in trigonometry, we might use three numbers - the lengths of two sides of a triangle and the angle between them - to compute another number, the length of its third side.

Let's start thinking about mathematics by first asking, 'what is a number?' The ancient Greek Pythagoras (6th century B.C.) proclaimed, "Number is the

principle and source of all things." In the last decade or so, cognitive scientists have asked the question, "Where did the capacity to understand numbers come from, and what is it exactly?" One approach that has proved very fruitful in understanding this capacity has come from the study of infants.

RECOGNISING TWO-NESS

At first blush, it might seem a trivial sort of research program. After all, it is patently clear to us what 'one' means and how it is different from 'two' or 'five.' Surely even a baby must know this? But consider - what you see in the real world might be two apples, or two eyes or two slices of bread forming a sandwich. As visual objects, these are vastly different. They also 'behave' differently - you might give one of the apples to your pet monkey, but you would not do that with one of your eyes. And take





away one slice from the sandwich, and it's not really a sandwich anymore.

Nevertheless, we instinctively know that they are all instances of 'two-ness.' Besides, two notes strummed on a guitar, someone tapping you twice on your shoulder or saying "Hey! Hey!" are perceived, just like the two apples, as instances of 'two-ness.'

So, do infants also know about 'two-ness'? Do they have any numerical abilities at all? The answer seems to be 'yes.' At the tender age of five months, infants already show a sensitivity to the number of objects and events in a scene and can perform some basic 'mathematical' operations over these. These babies seem to know that $1+1=2$ and that $3 > 2$ (See box on page 43)

However, a rather strange thing happens if, instead of asking them to compare 3 versus 2, we ask them to compare 3 versus 4. All of a sudden, infants fail. However, while infants might not be able to discriminate 3 from 4, they are perfectly capable of distinguishing 11 from 48! How can we explain this?

To cut a long story short, as long as the ratio between numerosities being compared is sufficiently large, infants are capable of discriminating even large numbers. Such findings have led to the idea that there are two fundamentally distinct number systems in the human infant (and adult). The first, called 'subitizing,' is exact, but can count only small numbers (up to about 3). The other, 'magnitude estimation,' is inexact and depends on the ratio of the numerosities, but can be applied to large numbers.

As adults, we go beyond subitizing and magnitude estimation. We can (usually) tell that 134 is larger

than 129, or that 1023 is smaller than 1024. That is, we know the concept of natural numbers that follow each other in a successor relation (so that each number is followed by another that is exactly one more than itself). Yet, although we might observe that a bowl of *two* candies becomes a bowl of *three* candies when someone puts in another candy, how do we go from there to the idea of numbers as beads on a string that stretches to infinity?

OBSERVATION TO GENERALISATION

This is a classic problem of induction - going from a few observations to a generalization. For example, going from seeing a couple of black crows to thinking that all crows are black. The problem is, it's not clear how and why we make generalisations, which are almost like leaps of faith. For example, why don't we think that there is an upper limit to the numbers? Clearly no one has seen infinity - most of us would be hard pressed to count even the grains of rice in a bowl accurately!

Just as natural numbers is a system that we induce, so might all of mathematics be induced systems. In which case, systems of mathematics would be based on certain fundamental intuitions that all humans share. For example, we (babies included) seem to know without a shadow of a doubt that $1+1=2$. This seemingly banal equation reveals two kinds of intuitions: that of the numbers themselves, and that of the operation of addition. Going from such simple axioms (intuitive statements that are taken for granted) mathematicians over the ages have constructed vast intellectual edifices that most of us can scarcely comprehend.

Nevertheless, as far as we can tell, there is no getting around the fact that all of these systems rest on our



HOW DO WE KNOW THAT AN INFANT CAN COUNT?

In a typical experiment, the infant is confronted with a stage that has a screen in front. The experimenter first introduces one object (say a *Mickey Mouse* figure) from the left, and then another doll from the right. Subsequently, the screen falls, revealing either two dolls (as we would expect), or just one doll. Consistently, infants are surprised and look much longer at the stage when the screen falls to reveal an unexpected outcome. This works not just for objects, but also for events like bounces – 5 month-olds can tell apart a puppet bouncing three times from a puppet bouncing twice. In a different kind of experiment, experimenters put toys into a closed box. If only a single toy is placed in the box, infants search just once. If two toys are placed in the box, they continue searching a second time after retrieving the first toy. But, put in four toys, and infants don't search any more after pulling the first one out. So, this would suggest, young infants cannot represent numbers beyond 4.

intuition that $1+1=2$. You might think that someone could come up with another system, call it 'schmathematics,' that 'proves' that $1+1=2$. However, a famous theorem by Austrian mathematician Kurt Gödel shows that schmathematics will itself contain other intuitive statements that cannot be proved.

MATHEMATICS AS LANGUAGE

So, we can think of mathematical systems as being symbolic representations of ideas in our mind. Going beyond merely systems to manipulate numbers, we can think of mathematics as logical systems of organization. Such systems can be used to study a variety of things like quantities, structures, spacial arrangements, how things change and evolve over time, and even some aspects of human behaviour.

In this view, mathematics is a uniquely human system – not just in the trivial sense that our pets cannot solve calculus problems, but in the more subtle sense that it is a system that rests on human intuition, whatever that might be. In this sense, it is a socially constructed phenomenon – it relies on society for its transmission and elaboration. In the technological cultures of our times, our system of mathematics has evolved from ancient Greek, Egyptian and Indian systems, with subsequent generations of mathematicians building on the intuitions of their predecessors.

In this respect, mathematics is strikingly different from spoken (or written) language – Classic Greek or Sanskrit are just the same as they were in ancient times, but modern mathematics has evolved into exceedingly complex forms. For spoken language, in some rare cases, a group of individuals who do not have access to a language, create one from scratch. Astonishingly, such created languages share all the complexities of any other natural language.

In contrast, some isolated cultures like the Amazonian Pirahã tribe do not have even the natural number system (although they have subitizing and magnitude estimation). They seem to have just a few words for numerosities, like 'one,' 'two' and 'many,' with 'one' also being taken to mean 'a few' under certain circumstances. But by and large, their spoken language is as complex as any other.

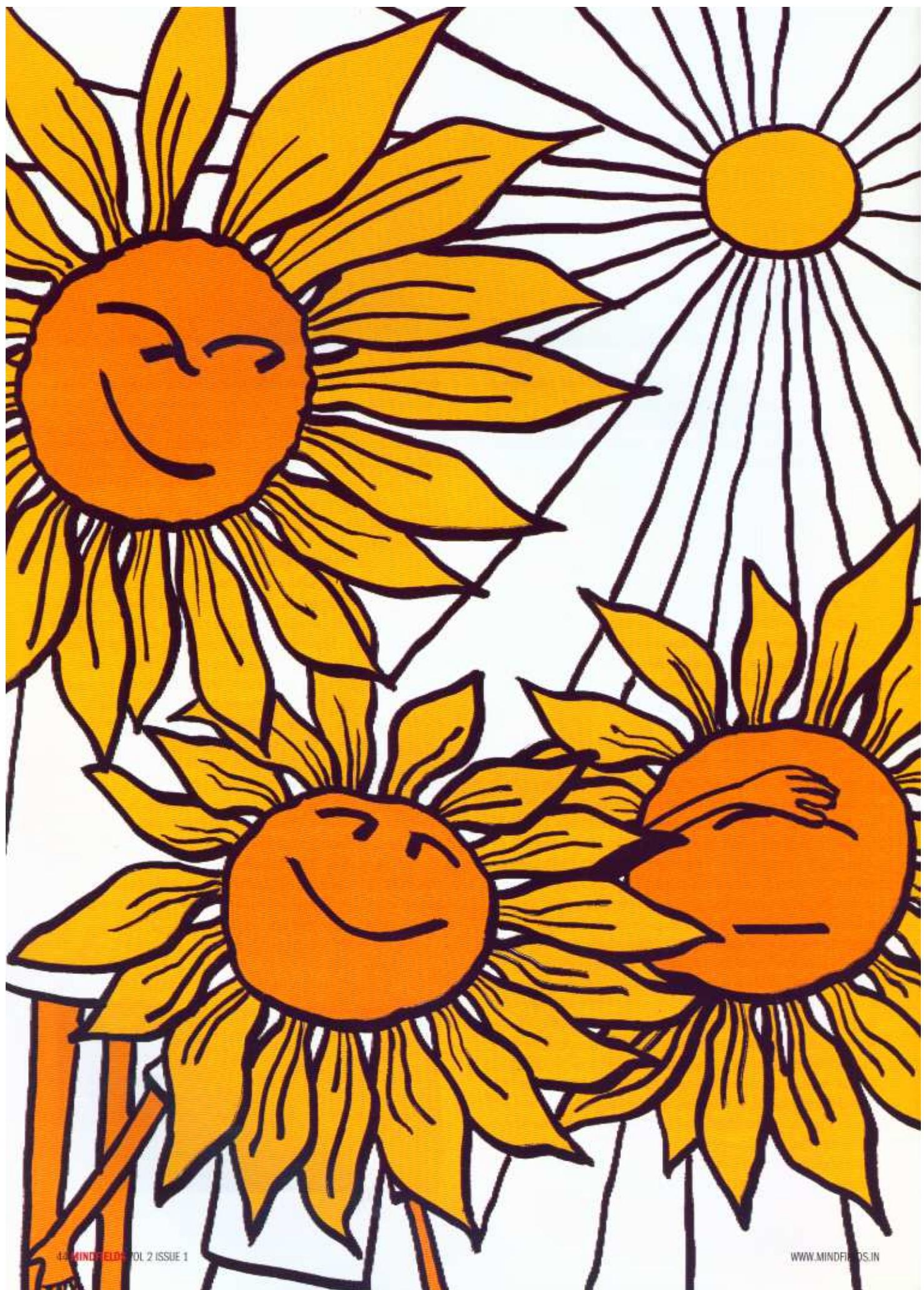
In the highest echelons of mathematical genius, intuitions, feelings, an appreciation of beauty and symmetry seem to play a large role in advancing mathematics. The Indian mathematician Ramanujan, without any formal training in mathematics, was described by his collaborator the British mathematician G.H. Hardy as being "...without a rival in his day" in his field of algebra. Interestingly, Hardy described that Ramanujan worked "...far more than the majority of modern mathematicians, by induction from numerical examples."

As Albert Einstein famously said, imagination is more important than knowledge. One might speak fluent Farsi, but it takes an Omar Khayyám to write the Rubaiyat. Similarly, mathematics is fundamentally about creative intuitions translated into systems that describe the nature we perceive. □

MOHINISH SHUKLA

Started off looking at microbes and writing programs. Has since been interested in how yeast cells respond to stress, how rat testes pack DNA into sperms, how forests are structured, how we hear fluent speech as a series of words. Loves cooking, video games, science fiction and PG Wodehouse. Read his writing at <http://mohinish.blogspot.com>





BONE OF CONTENTION

It goes by many names - Osteomalacia, Renal Osteodystrophy, Paediatric Osteomalacia, Vitamin D deficiency, Renal Rickets. Is it possible that Rickets is making a comeback? Is your child getting enough sun?

TEXT: NEHA BAIN

ILLUSTRATION: STUDIO UMBILICAL

Sunitra Kanth, a Delhi-based bank employee was holding her first child when the doctors told her she had Vitamin D deficiency. It sounded innocuous enough, and the issue fell by the wayside. Today, one year later, the sight of her son's waddling gait makes her feel like a culprit. He has rickets. "We have put him on medication. It is curable, but I could have acted upon it a long while back," says Kanth.

Unfortunately, Kanth is no exception. Once considered just a nutritional deficiency, experts say that rickets is making a comeback. And the demographic it is affecting is changing. Earlier, most rickets cases trickled in from rural areas, where children had a deficient nutritional intake. This time round, cases from urban areas are on the rise, and it may be attributed to the rapidly changing lifestyles.

Rickets is considered a 21st century disease. Despite the availability of Vitamin D and its demonstrated efficacy in preventing rickets, Vitamin D-deficiency rickets is still a public health problem in many Asian countries, including India. However, since its spread has been

gradual compared to other diseases, its severity remains largely ignored.

Rickets occurs when the body demands high levels of calcium and phosphate. The disease leads to a softening and weakening of bones, and is primarily seen in children between 6 to 24 months old. Doctors say rickets is increasing for two main reasons - babies are being breastfed longer with no Vitamin D supplementation; children and mothers get less sun exposure. To deal with this situation, it is pertinent to understand its epidemiology.

The story of rickets begins with Vitamin D and its primary mode of synthesis, sunlight. Dr R. N. Srivastava, senior paediatric nephrologist, Apollo hospital (Delhi) explains, "Sunlight is the most prominent source of Vitamin D. Skin creates the vitamin when it is in contact with sunlight. It is subsequently transferred to the liver via blood. The liver, in turn, produces hormones involved in many metabolic processes beyond bone integrity and calcium homeostasis."

However, there are conflicting concerns about the quality and quantity of exposure to the sun, resulting into reduced outdoor activity of children. On the one hand, there are concerns about the hazards and consequences of excessive sun exposure; on the other, there are concerns about lifestyles with inadequate sun exposure and the risk of vitamin D deficiency.

Ruchika Lal, a 35-year-old woman working in a Gurgaon MNC, has recently invested in a house in a sprawling housing society. Her rationale? She wanted a place where all amenities were close at hand, to save her two daughters from excessive sun exposure. Now, whether it's a swimming pool or a toddler's tennis court, it's all within stone's throw. "I don't want them to get tanned or breathe polluted air if I can help it," remarks Lal. The girls are equally excited. "I think my home is just perfect. We can play, swim, go for tuitions and dance classes - all next door," says 10-year-old Sanya Lal. When asked about outdoor activities, Sanya quips, "Mummy takes us to the mall every weekend."

As compared to sunlight, diet provides less than 10 % of the body's vitamin D requirements in the best of circumstances. A 10-15 minute full-body sunlight exposure during summer months is deemed more beneficial.

Says Mumbai-based paediatrician Dr S.K. Mathur, "The amount of UV (ultraviolet) exposure available for the synthesis of Vitamin D depends on many more factors than time spent outdoors. Degree of skin pigmentation, body mass, season, extent of air pollution blocking UV light, the amount of skin exposed and type of clothing, level of UV protection in sunscreens - all make a difference."

Dr R.K. Malik, consultant paediatrician, Moolchand Children's Hospital clarifies, "Exposure for long and frequent stretches can create cancerous situations. Moderate exposure, such as while playing or strolling, is harmless. In really hot places it is best to go outdoors wearing sunscreen. Sunscreen filters harmful ultraviolet rays."

Rickets may be Inherited

There is evidence of low circulating serum concentrations due to inadequate sunlight and inadequate Vitamin D in women of child-bearing age

and a subsequent deficiency in newborn children. It is generally agreed that a serum 25(OH) D concentration below 25 points is associated with rickets and osteomalacia. In recent reports, 18% of pregnant women in the UK, 25% in the UAE, 80% in Iran, 42% in northern India, 61% in New Zealand and 60 to 84% of pregnant non-Western women in the Netherlands have been shown to have serum 25(OH) D concentrations below 25 points. These studies raise the concern that infants are entering a Vitamin D-deficit world.

Recent studies from UAE, Iran, India, United Kingdom, Greece and the US have demonstrated a high prevalence of Vitamin D-deficiency in mother-infant pairs at birth.

Points out Delhi-based gynaecologist, Dr Vasudha Kulkarni, "One has to understand that there is a strong relationship between maternal and foetal Vitamin D levels. Breastfeeding can support a child's requirement for Vitamin D only up to six months of age. From there on, they have to be provided supplements to meet the increasing calcium demands with the growing bone cage. Nursing mothers who only breast feed their infants, may be put on medication with Vitamin D. Excess of everything is bad, but your physician can tell you if your child needs more Vitamin D or calcium."

Reports have it that in many populations, where sun exposure is severely limited and Vitamin D supplementation not common, there is a high prevalence of Vitamin D deficiency in nursing mothers. The writing on the wall is clear to see - severe Vitamin D deficiency is a growing concern internationally in pregnant and non-pregnant women, as well in nursing mothers.

Vitamin D deficiency goes beyond rickets

What seemed to be a rare entity has become so common that Vitamin D deficiency is now linked with long-latency diseases. Says Dr Mathur, "It is important to understand that Vitamin D affects all organ systems, not just bones and calcium. In addition to rickets, epidemiological evidence suggests that lack of Vitamin D supplements in infancy and early childhood may increase the probability of Type 1 diabetes."

Problem in absorption and metabolism of Vitamin D can lead to other problems like chronic kidney failure, long-

term kidney dialysis, diseases of the small intestines with malabsorption, and disorders of the liver and pancreas.

The way forward

It is true that rickets is treatable, but it has to be addressed at a very young age. The idea is also to prevent recurrence. If the illness is not treated, bone deformities can develop, although in most cases they can be treated in time and the patient recovers without further problems.

"If not corrected while children are still growing, skeletal deformities and short stature may be permanent. With early intervention, most skeletal deformities can be corrected by maintaining a good posture or using braces. Certain skeletal deformities, though, can only be corrected surgically," says Dr S. C. Arya, chairperson, department of paediatrics and director, Centre for Child Health, Sir Ganga Ram Hospital.

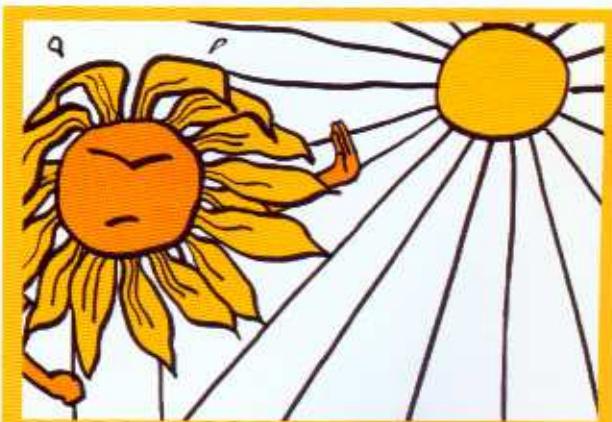
In nutritional-deficiency led rickets, the treatment may last for 1-2 months and can be taken care of by eating supplements that cost Rs 200-300 per month. The course, however, gets prolonged in case of metabolic problems.

Shantanu Dutta, age 12 years, is having a tough time combating the disease. Apart from rickets – he has a kidney problem. "Vitamin D gets metabolised in the body in two stages to be converted into an active form. One is through the kidney, and then the liver. In case of malfunction of either, supplements fail to play a significant role. In Shantanu's case we have put him on activated vitamin D, which does the needful inspite of a malfunctioning kidney," explains Dr Mathur. It may cost anywhere between Rs 500-Rs 1000 per month depending on its extent. The best way to combat the illness is to detect it at an early stage. "Parents should watch out for physical deformities like a large protruding forehead, widened wrists, protruding abdomen and bowing of legs.

Symptoms of rickets may fade gradually with the replacement of deficient calcium, phosphorous, and Vitamin D. "Doctors may prescribe a biologically active form of Vitamin D in people who have difficulty converting the vitamin to its active form," adds Dr Arya. Including rich sources of vitamin D to the diet is a must.

Studies suggest that owing to insufficient sun exposure and inadequate corrective Vitamin D supplementation, many populations have shifted from Vitamin D sufficiency to deficiency. However, methods to prevent

Vitamin D deficiency and get an adequate intake of the vitamin and calcium can help fight this childhood disorder. In turn, this can also reduce the risk of osteoporosis and other long-latency disease processes associated with Vitamin D deficiency. It is time for action – vigilance, detection and intervention to tackle this important public health problem. □



HAVE YOU BEEN FIGHTING THE SUN TOO HARD?

Symptoms associated with rickets:

- Spine deformities – spine curves abnormally, including pelvic deformities
- Increased incidence of fractures
- Dental deformities
- Delayed formation of teeth
- Decreased muscle tone (loss of muscle strength) and frequent muscle cramps
- Impaired growth and weakness
- Short stature (adults less than 5 feet tall)
- Fever or restlessness

HERE'S WHAT YOU CAN DO TO PREVENT RICKETS

- Drink vitamin D-fortified milk
- Consume sufficient calcium, and other minerals
- Get sufficient exposure to sunlight – 15 minutes a day is considered sufficient. Any longer than that requires sun protection (Sunscreen SPF 15 and above)
- Include rich sources of vitamin D like fish, liver, cod liver oil, mushrooms, eggs in your daily diet

NEHA BAHU

Was working as a journalist with a leading national daily until recently. A wanderer by nature, you read some of her arbitrary thoughts here: <http://nehabahu.blogspot.com>





THERE'S A LINGUIST IN THE MUSIC ROOM

Peggy Mohan is an author, linguist, animator. She also teaches at Vasant Valley School.

INTERVIEW: AMRUTA PATIL
PHOTOS: LUKE HAOKIP

We met Peggy at her South Delhi home on a Sunday morning. The house is as characterful as the teacups, the conversation and the inimitable clothes Peggy designs and handsews.

WHERE DID YOU GROW UP?

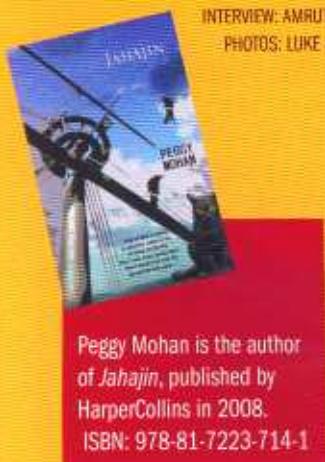
Trinidad, West Indies

WHAT SCHOOL/COLLEGE DID YOU GO TO?

The University of the West Indies (Trinidad campus), and the University of Michigan, Ann Arbor (USA)

WHAT WAS YOUR OWN SCHOOL EXPERIENCE LIKE?

I guess I was a bit of a loner, but really into music – particularly choir and orchestra) and obsessive about studies. After leaving school I kept in better contact with the teachers than other students.



Peggy Mohan is the author of *Jahajin*, published by HarperCollins in 2008.
ISBN: 978-81-7223-714-1

I always had a sense of what the teachers were thinking - not so with classmates.

WHY DO YOU TEACH?

At first I reasoned that I would otherwise waste the time from early morning to 3pm. Also, I really love being with kids, and find their questions more exciting than the questions older students or adults ask. Their world is full of light and color and magic. Children are the best anti-depressant!

WHAT (ALL) DO YOU TEACH, AND AT ALL WHAT LEVEL?

Western Music (Grades 2-5), English (Grade 2). I taught drama last year. My favourite age-group to work with is Elementary school, Grades 2-5. I don't know if I'd enjoy teaching teenagers.

WHAT ARE THE MOST VALUABLE THINGS YOU BRING INTO CLASS?

A sense that we're really all equal, that I learn as much from them as they learn from me. And that when I make mistakes something new and interesting happens.

WHAT IS YOUR TEACHING PHILOSOPHY?

That answers are things we discover together, that it is all a great big puzzle, and lots of fun. We discuss the lyrics and subject matter of our songs, they're all like English comprehension passages.

WHAT IS THE FIRST THING YOU CHANGE WHEN YOU WALK INTO A CLASSROOM?

Mine is a music room. I added to the wood content in the room and put up posters and cartoons all over the walls to 'sweeten' the sound.

WHAT DO YOU CARRY IN YOUR BAG EVERY MORNING?

A notebook to write down any ideas that strike me that I'm sure to forget if I leave them in my head.

HOW DO YOU LATERALLY CONNECT SUBJECTS IN YOUR CLASS?

I keep asking other teachers about what they're doing in Science, English, Maths, Geography and look for songs to suit, even on internet, and make up tunes if I need to. Often, I'll rewrite a jazz song with new lyrics that cover everything in a lesson in a fun way.

A FAVOURITE TEACHING AID?

Large cartoons that I draw on colored chart paper and stick onto the walls - I give these away later.



ONE THING YOU WOULD CHANGE ABOUT SCHOOLS...

The pressure of time, which, I feel, is at the root of all the flare ups in the classroom - the idea that every lesson can be dispatched in forty minutes. Some can't, unless the kids are as orderly as robots.

HOW HAVE YOUR TRAINING AS A LINGUIST INFLUENCED THE WAY YOU TEACH MUSIC?

Yes, I bring in training about phonetics and acoustics, and we are not shy to do songs in Japanese, Spanish, French, Bengali, Zulu.

WHO HAVE YOUR TEACHING ROLE MODELS BEEN?

Indian classical musicians. A class is a 'Raga', where you have a theme, 'allowed' notes, and freedom to take it wherever it goes (where your 'audience' wants you to go).

THE GREATEST CHALLENGE YOU HAVE DEALT WITH IN CLASS?

Teaching Grade 2 a harmonized song that other schools would only teach in senior school. That meant finding a way to help them not go wrong at all, to play one section's part on the piano, while singing the other's with them. Brain growth for me!

CLASSROOM TRICK THAT WORKS...

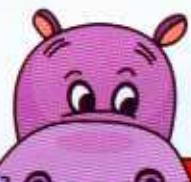
Well, since my classes are not quiet, I fear the kind of disorder that puts a strain on my voice, since I'm supposed to be a singer. In summer, when things go out of hand, I switch off the fans till kids settle down!

FAVOURITE BOOKS...

Peter Hoeg's 'Borderliners' and 'Miss Smilla's Feeling for Snow', Jean Rhys' 'Wide Sargasso Sea'.

WHEN YOU ARE NOT TEACHING YOU ARE...

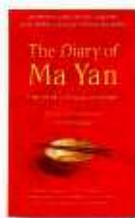
Writing. Designing and stitching clothes - it relaxes me. Tending to my little garden. Writing comments on blogs. Things like that. But I never listen to music, and I don't have a TV. □



HIPPOCAMPUS

RECOMMENDED READING

TEXT: ARAVINDA A.



THE DIARY OF MAYAN: THE LIFE OF A CHINESE SCHOOLGIRL

Author: Ma Yan

Edited by Pierre Haski & Published by Virago Press

ISBN: 1-84408-236-9

Ages 12+

This time, I found myself drawn to books on history, biographies and autobiographies. There were some amazing books to pick and choose from but one that caught my attention was *The Diary of Ma Yan*.

It's a series of journal entries by a 13-year old Chinese girl, Ma Yan who lives in a remote village in northern China, inhabited by the Islamic Hui community. The book begins from the time when her mother tells Ma Yan that she may not be able to return to school as the family has no money to pay for her education. The girl is distraught and her mother wills herself to work harder to keep her daughter in school.

As it happens, Ma Yan is a prolific diary-keeper and in 2001, a French expedition with Pierre Haski was visiting Zhangjiashu village when a woman suddenly came out of the crowd to hand over three notebooks to them. She was Bai Juhua and the notebooks contained the diaries of her daughter Ma Yan.

While she eats, my grandmother says to me: 'You look so serious! I really wonder what it is you're writing. Our lives have so little interest.'

Ma Yan's writing captures the thirst of the parched land, the routine monotony of their lives, and the longing for respite, however brief it may be. Even her lessons at school seem weary as the teachers, indoctrinated in Communist philosophy over decades, go about doing their jobs unenthusiastically. There is none of the excitement of exploring or discovering something in class and rather, the pressing need to perform well if Ma Yan has to stay in school.

The recurring themes are of Ma Yan's concern for her mother who works in the fields to earn money to send

her children to school. Ma Yan often feels an enormous sense of guilt tinged with gratitude for she knows the sacrifices that are being made to keep her in school. When she sees her grandparents, her concerns envelop them too. She looks at her 80-year old grandmother and wishes that she'd live to be a hundred so that Ma Yan has time to grow, find employment and offer them the happiness they have never known thus far.

The publication of her diaries ensured that Ma Yan could stay in school. Furthermore, support came from various philanthropists and more such girls were able to return to school. It's a great book to pick up and initiate discussions on China, Communism, population challenges, and the existence of a religious community within an atheistic society.



THE LONG LOST MAP

Author: Pierdomenico Baccalario aka Ulysses Moore

Published by Scholastic

ISBN: 0-439-77439-X

Ages 9 to 12

Okay, I confess I accidentally skipped the first volume and picked up the second in the series. But it was such a fun ride that I couldn't be bothered right then to stop and see that I was in the wrong book.

Have you ever wanted to time-travel? Not in a contraption that will squeeze the atoms in your body and realign them (hopefully) when you reach your destination. But more like stepping through a magic door and voila, you're in Egypt. Well, I have always wanted to time travel and with this book, I felt like an armchair time traveller.

Jason and Julia Covenant are eleven-year-old twins, who have just moved to Kilmore Cove with their parents. Their parents are away and the two are home alone at Argo Manor with only Nestor the butler for company. Rick Banner, a friend, who has spent all his life at Kilmore Cove, comes over to Argo Manor and the three find

themselves in an adventure that begins right away in Chapter 1. Well, as it happens, the three of them have been messing about with the diary of Ulysses Moore, former resident of Argo Manor and find themselves through the door that takes them way back in time. Eventually, they will figure that it is ancient Egypt.

In a small accident, Julia returns to our world but the boys are stuck in time, where they meet, Maruk (daughter of the High Priest, no less) who befriends the two. It's not just a stroll through an old world for Jason and Rick soon figure that Ulysses Moore has left a clue for a map of Kilmore Cove and they begin their search for it. All is well until they hear their neighbour from the other side, the nasty Oblivia Newton, also in ancient Egypt, also looking for the very same map! The plot thickens and a thrilling journey through ancient Egypt is well underway. Meanwhile in Argo Manor, Julia and Nestor find themselves fighting Oblivia's manservant, the big bad Manfred.

The story doesn't end with this book. There are a total of 6 volumes and this is just Book 2! So make a pot of hot chocolate, stack up on your favourite munchies and begin this journey! Along the way, you get a good dose of history lesson too!

For books set in Ancient Rome, try the Roman Mysteries series by Caroline Lawrence; for King Arthur's times, the Squire Tales by Gerald Morris, and on Greek Gods, the Percy Jackson series by Rick Riordan. Stories of yore were never this much fun!



CALCULATOR ANNIE

Author: Alexander McCall Smith

Published by Bloomsbury

ISBN: 0-7475-8040-5

Ages 7 to 9

Having enjoyed McCall Smith's No. 1 Ladies Detective Agency so thoroughly, I was thrilled to find his books for children. And I haven't stopped thrusting them on all who ask me for a recommendation, be it voracious readers or slightly reluctant ones.

Calculator Annie is such a fun read, especially for those who don't enjoy math so much. Annie is a little girl who cannot add 2 and 2. Nor can she subtract, multiply or divide. Worse still, she cannot use the calculator to help her out! Poor Annie! She struggles through her math homework and even the expert who

visits the school to see if she can be helped shakes her head in dismay. (Sigh!) One day Annie falls asleep with her father's calculator under her head and strange things happen when she wakes up. She can add more than her teachers, and even the Headmaster can manage! Annie is a math genius!

As you will see, life as a genius is not an easy one. Annie figures it too, for you cannot be smarter than a computer and hope no one will notice. Soon, she is invited to participate in an international mathematical competition with Mrs Nandidrooka and Mr Willoughby Quick, renowned mathematicians. It's not much of a mystery, but I won't give away the end anyway!

Alexander McCall Smith was born in Zimbabwe and has lived there and in Scotland. Besides *Calculator Annie* and other books like *The Popcorn Machine*, *The Joke Machine*, *The Five Lost Aunts of Harriet Bean*, and books for adults, he has also authored books on medical and criminal law, and philosophy. □

THE GOOD READING GUIDE

- The Falcon's Malteser (Diamond Brothers) by Anthony Horowitz Ages 12+
- The Fall of the Berlin Wall (Days that Shook the World) Ages 12+
- Kaiulani (The Royal Diaries) Ages 12+
- The Diary of Ma Yan Ages 12+
- Crash Course (Hover Car Racer) by Mathew Reilly Ages 12+
- Letters from Rilka by Karen Hesse Ages 12+
- The Last Emperor (Kids who Ruled), Ages 9 - 12
- Phone Home, Persephone! (Myth-o-mania) by Kate McMullan Ages 9 - 12
- The Door to Time (Ulysses Moore) by Michael Merriweather Ages 9 - 12
- King's Courage (Blast to the Past) Ages 9 - 12
- Julius Caesar (Get a Life!) by Philip Ardagh Ages 9 - 12
- How Noor found her family (Lost and Found) Ages 7 - 9
- Calculator Annie by Alexander McCall Smith Ages 7 - 9
- Everybody Cooks Rice by Norah Dooley Ages 7-9
- Manu Mixes Clay and Sunshine by Bulbul Sharma and Shanti Devi Ages 7 - 9
- David Beckham (Brilliant Brits) by Richard Brassey Ages 7 - 9
- Let's Look Inside Pyramids (Torchlight) by Claude Delafosse and Gallimard Jeunesse Ages 5 - 7
- Knots on a Counting Rope by Bill Martin Jr. and John Archambault Ages 5 - 7
- Babu the Walter by Sirish Rao Ages 5 - 7
- Favourite Classic Writers by Nikki Gamble - For teachers

ARAVINDA A.

Joined Hippocampus to be around books. Likes writing and tries to earn a living from it. Loves the company of dogs. Agrees completely with the anon Zen master who said, "I never got lost because I don't know where I'm going."



NEWSBYTES

ROBOTS COME TO CLASSROOMS

DELHI

More than 100 schools across India and around 20 in Delhi are using robotics in their classrooms to enhance creativity among students and to sharpen their brains, besides teaching them problem-solving skills and teamwork. Robotics is the science and technology of robots, their design, manufacture, and application.

While few schools are using robotics as a learning aid, most of them are utilising it in their activity/hobby classes wherein students, mostly class VI onwards, can make robots with the help of Lego Robotic Kits and learn about physics, mechanics, electronics and even fine arts.

Students are given 'challenges', which are tasks to be accomplished within a stipulated time period. Each challenge carries its own set of obstructions, which are tackled by the students based on his/her logical ability.

Students have to logically use basic concepts such as gears, levers, belts, pulleys, wheels and axels. They have to calculate, take readings, construct and programme their robot according to the challenge, which involves teamwork, sharing of ideas to resolve a common problem and being creative. In the process, students have even created robots that can sense the environment and react accordingly.

Says Shabnam Sharma, director, Techtronics (India) Limited: "Robotics is an exciting field that integrates science, engineering, mechanics, electronics and even fine arts. Lego's education division created the platform 'Mind Storms for Schools' to promote activity-based learning and I think all schools should have such robo clubs to create young scientists."

"The problem with our education system is that we don't teach students structured problem-solving skills," feels Apurva Kalia, a Lego enthusiast. He says: "The school curriculum is so packed that problem solving skills often get ignored. These are significant to a child's growth and need to be given their due importance."

Bindu Balakrishnan, in-charge (Robotics), Vasant Valley School, says: "We are using robotics in our school both as a learning aid and as an activity. The objective is two-fold. First, it helps in recreation and second, it helps learning, especially concepts (laws) in physics. In the process, students learn ways to solve a problem besides learning to work in a team."

TEACHING BAD FOR HEALTH?

Seventy per cent of teachers say their health has suffered because of their job, and over 50% are stressed by working in education, according to an Association of Teachers and Lecturers (ATL) and Teacher

Support Network survey in USA.

The health impact is even higher among school leaders and heads of department with 75% and 73% respectively complaining. And female teachers (72%) admit to suffering more than male (66%).

These findings are unsurprising since staff at all levels say demands on them and their time have increased over the past five years. For school leaders the biggest change has been in the amount of extra responsibility (96%), for heads of department a higher workload (91%) and more admin (91%), and for teachers new education initiatives (84%).

Among those whose health has been affected, 51% have gone to their local GP to seek help and 36% have taken time off work. The most widely reported health problems are stress (85%), disturbed sleep patterns (83%), and exhaustion (82%).

ATL general secretary, Dr Mary Bousted, said: "The demands and pressures on those working in school is escalating. They are having to cope with endless government initiatives making changes to what is taught and the way it is taught. It is unsurprising that so many teachers and lecturers are contemplating getting out of teaching, and that it is so hard to find people prepared to take on headship or leadership roles." Patrick Nash from the Teacher

NEWSBYTES

Support Network said: "Schools and the government must work together to ensure the introduction of wellbeing programmes and better policies to look after the health of their staff."

SCHOOL IN YOUR NAME FOR 45 LAKHS

MADHYA PRADESH

Want to make any of your near or dear ones immortal? The only condition is that you must have a deep pocket.

The state education department of Madhya Pradesh has launched a novel scheme to attract finance for the fund-starved government schools. The government is ready to name its schools after individuals – dead or alive – in return for a stipulated donation.

The amount is Rs 45 lakh for a higher secondary school, Rs 36 lakh for a middle school and Rs 10 lakh for a primary school.

The only condition is that the person in whose name the school is proposed to be named should not have or have had a criminal background.

Police verification will be mandatory in all cases. Applications have to be submitted to the school education department through the district education officer.

The government has already received at least two proposals. A prosperous agriculturist family of the Jaura tehsil of

Morena district has offered to pay Rs 50 lakh for naming the government higher secondary school in their village as Pandit Ramratan Chaudhary School after the patriarch of the family.

In addition, a teacher in Narsinhgpur district has agreed to pay Rs 10 lakh for naming a school after her deceased husband. Both the proposals are likely to be cleared by the education department soon.

OUR FIRST CHILDREN'S UNIVERSITY

AHMEDABAD

The state government on Monday announced that it will establish country's first Children's University as part of 'Nirogi Balak Year'.

Initially, an institute called 'Bal Gokulam' will be started which will later be converted into Children's University. The university is aimed at developing scientific methods for facilitating mental and physical development of a child. It will be hub for training personnel involved in teaching and other developmental aspects of children.

"The university will be the first ever centre where numerous methods of child learning like recreational activities, toys, children's songs, children's movies, child nutrition and other aspects will be scientifically tested and studied for implementation of methods that will contribute positively to the development of children

in the state," said finance minister Vajubhai Vala in a statement released today.

Vala said that the true yardstick of Human Development Index (HDI) is not the span of a child's life but the quality of his or her life. The state has also declared the year 2008-2009 as 'Nirogi Balak Year' wherein stress would be laid on bringing down the Infant Mortality Rate (IMR) and Maternal Mortality Rate (MMR)

FREE HAIRCUTS FOR STUDENTS

JAMSHEDPUR

The Jharkhand government plans to depute a barber in each of its 40,000 schools, State's Human Resource Development Minister Bandhu Tirkey recently announced at a gathering of students, teachers and parents at Potka.

"Each barber will be paid Rs. 1,500 per month. Only military style haircuts will be given. Barbers will also give lessons in grooming to each student and ensure that they wash their hair regularly and keep it clean," said Tirkey. Lack of hygiene and the dishevelled appearance of the students were cited as reason.

The Jharkhand government had earlier started the programme of celebrating birthdays of students of government schools, on the lines of public schools. It has allotted funds for the purpose to each school. □

MUST WATCH

AN INCONVENIENT TRUTH

Director: Davis Guggenheim
Genre: Documentary/ 2006
Running time: 94 mins



Director Davis Guggenheim eloquently weaves the science of global warming with Mr. Gore's personal history and lifelong commitment to reversing the effects of global climate change. A longtime advocate for the environment, Gore presents a wide array of facts and information in a thoughtful and compelling way. *An Inconvenient Truth* is not a story of despair but rather a rallying cry to protect the one earth we all share.

The film closely follows a Keynote presentation (dubbed "the slide show") that Gore presented throughout the world. It intersperses Gore's exploration of data and predictions regarding climate change and its potential for disaster with Gore's life story. It weaves in events that changed his worldview, including his college education with early climate expert Roger Revelle at Harvard University, his sister's death from lung cancer, and his young son's near-fatal car accident. Throughout the film, Gore makes comments regarding his loss to George W. Bush in the 2000 United States presidential election. For comic effect, Gore also uses a clip from the *Futurama* episode "Crimes of the Hot" to explain global warming.

In the slide show Gore reviews the scientific opinion on climate change, discusses the politics and economics of global warming, and describes the consequences he believes global climate change will produce if the amount of human-generated greenhouse gases is not significantly

reduced in the very near future. A centerpoint of the film is his examination of the annual temperature and CO₂ levels for the past 650,000 years in Antarctic ice core samples. The film includes many segments intended to refute critics who say that global warming is unproven or that warming will be insignificant.

MARCH OF THE PENGUINS

Director : Luc Jacquet
Genre: Documentary/ 2005
Running Time: 1 hr 20 mins



Each winter, alone in the pitiless ice deserts of Antarctica, a truly remarkable journey takes place as it has done for millennia. Emperor penguins in their thousands abandon the deep blue security of their ocean home and clamber onto the frozen ice to begin their long journey into a region so bleak, so extreme, it supports no other wildlife at this time of year. In single file, the penguins march blinded by blizzards, buffeted by gale force winds. Guided by instinct, by the otherworldly radiance of the Southern Cross, they head unerringly for their traditional breeding ground where—after a ritual courtship of intricate dances and delicate maneuvering, accompanied by a cacophony of ecstatic song—they will pair off into monogamous couples and mate.

The females remain long enough only to lay a single egg. Once this is accomplished, exhausted by weeks without nourishment, they begin their return journey across the ice-field to the fish-filled seas. The male emperors are left behind to guard and hatch the precious eggs, which they cradle at all times on top of their feet. After two long months during which

the males eat nothing, the eggs begin to hatch. Once they have emerged into their ghostly white new world, the chicks can not survive for long on their fathers' limited food reserves. If their mothers are late returning from the ocean with food, the newly-hatched young will die.

Once the families are reunited, the roles reverse, the mothers remaining with their new young while their mates head, exhausted and starved, for the sea, and food. While the adults fish, the chicks face the ever-present threat of attack by prowling giant petrels. As the weather grows warmer and the ice floes finally begin to crack and melt, the adults will repeat their arduous journey countless times, marching many hundreds of miles over some of the most treacherous territory on Earth, until the chicks are ready to take their first faltering dive into the deep blue waters of the Antarctic. A documentary that is poetic as it is profound.

HORTON HEARS A WHO!

Director : Jimmy Hayward, Steve Martino
Genre: Animation, Adventure, Comedy/ 2008
Running time: 88 mins



One day, Horton the elephant hears a cry for help coming from a speck of dust. Even though he can't see anyone on the speck, he decides to help it. As it turns out, the speck of dust is home to the Whos, who live in their city of Whoville. Horton agrees to help protect the Whos and their home, but this gives him nothing but torment from his neighbors, who refuse to believe that anything could survive on the speck. Still, Horton stands by the motto that, "After all, a person is a person, no matter how small." □

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How wrong we are.

share what they know instinctively. □

You should have been there to see the downfall of the great thinkers in my class the other day. Overthrown by unboxed thoughts shared by a seven-year old. The setting is an exciting, mixed-age class where children are not asked to 'sit quietly', where children between the ages of six and nine freely share their take on the world. I, as chief honcho (read 'teacher') had presented a lesson on the evolution of species. This was a story accompanied by an eight-foot long pictorial timeline. Single-celled organisms to human beings – the tale

PRIYA RAJAGOPALAN

Turned from Applied Psychology to Teaching while researching Inclusive education and fell for the 'M' word (Montessori) hook, line and sinker. Has trained for and taught in multi grade classrooms, ranging from preschool to junior high, from Chennai to California. Is an avid reader with a nomad's soul.



Who put the kids in a box?

TEXT: PRIYA RAJAGOPALAN
ILLUSTRATION: AMRITA PATIL

"It took me four years to paint like Raphael - but a lifetime to paint like a child"
Pablo Picasso

'Think out of the Box' could be a bestseller on the self-help book list. The more intriguing matter at hand is—where did this mythical box come from? And how did we get into it? Because if you observe the confident, talkative, spontaneous, curious, innovative children who walk into preschools to begin their fifteen year odyssey through the world of education - you don't get the feeling they are in any sort of box!

We fail to ask ourselves as parents and educators, 'Who put the kids in a box?' because perhaps we know the answer. We did. I hear you say—"No! I encourage creativity, discussion and debate in my 8th grade English class". And kudos to you for doing that. But the fact is that what was once a natural instinct is now being 'taught' artificially.

Let us backtrack to that first step into school with a child who, from being a wailing, dependent little bundle of joy has just spent her last 3 years mastering the art of speech and movement. A three-year old once enlightened me about her achievements saying "I learnt it all by myself". One would expect a standing ovation for this individual, right? Wrong. The first thing expected of this genius is - 'Sit in one place and be quiet'. Subliminal programming has already begun. The message? 'I will show you all that is important.' How wrong we are!

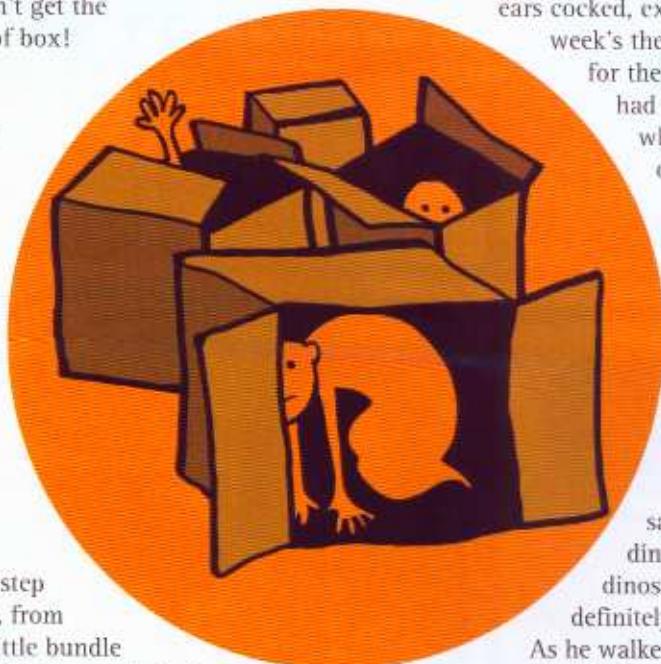
You should have been there to see the downfall of the great thinkers in my class the other day. Overthrown by unboxed thoughts shared by a seven-year old. The setting is an exciting, mixed-age class where children are not asked to 'sit quietly', where children between the ages of six and nine freely share their take on the world. I, as chief honcho (read 'teacher') had presented a lesson on the evolution of species. This was a story accompanied by an eight-foot long pictorial timeline. Single-celled organisms to human beings - the tale

being told using personification of these creatures, speaking of why they may have moved from water to land and so on.

A week later, a colleague and I were sharing thoughts about the eternal chicken and egg story - which came first? Along came one of my curious young buddies, ears cocked, expecting a continuation of last week's theme. I explained to him that for the longest time, great thinkers had been pondering about whether the chicken came first or the egg and they couldn't make up their mind. The child looked at me with a 'so what seems to be the issue here' look that only a six-year old can give a teacher who ought to know better. "Of course it was the egg", said he. I asked him to give me a reason for this decisive statement and he said, "See, in the timeline story, dinosaurs came before birds, and dinosaurs lay eggs, so the egg definitely came before the chicken!"

As he walked away nonchalantly, I marvelled at the purity of his reasoning while smiling at the thought of this poor dinosaur, waiting patiently for her egg to hatch only to find a fluffy, yellow chick emerge from it.

It's been six years since and I hope and pray the little guy never found a 'box' to clamber into. Let us hope we don't make children wait all their lives to be able to share what they know instinctively. □



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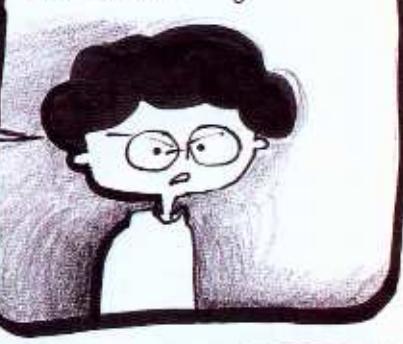
Notes from the Frenches

STORY: SRIDHAR RAJAN
ILLUSTRATIONS: AMRUTA PATIL

8 year old Monty took offense at something and declared that he was leaving home ...



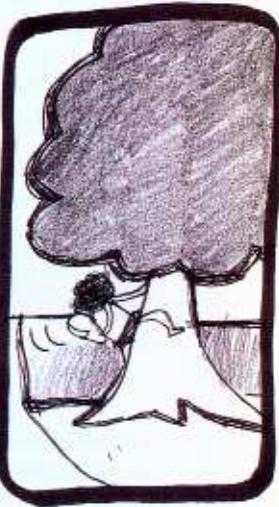
... to live in a tree in the driveway ...



A LITTLE
TREETIME
WILL BE
GOOD



LISTEN,
I WANT MY
SON BACK.

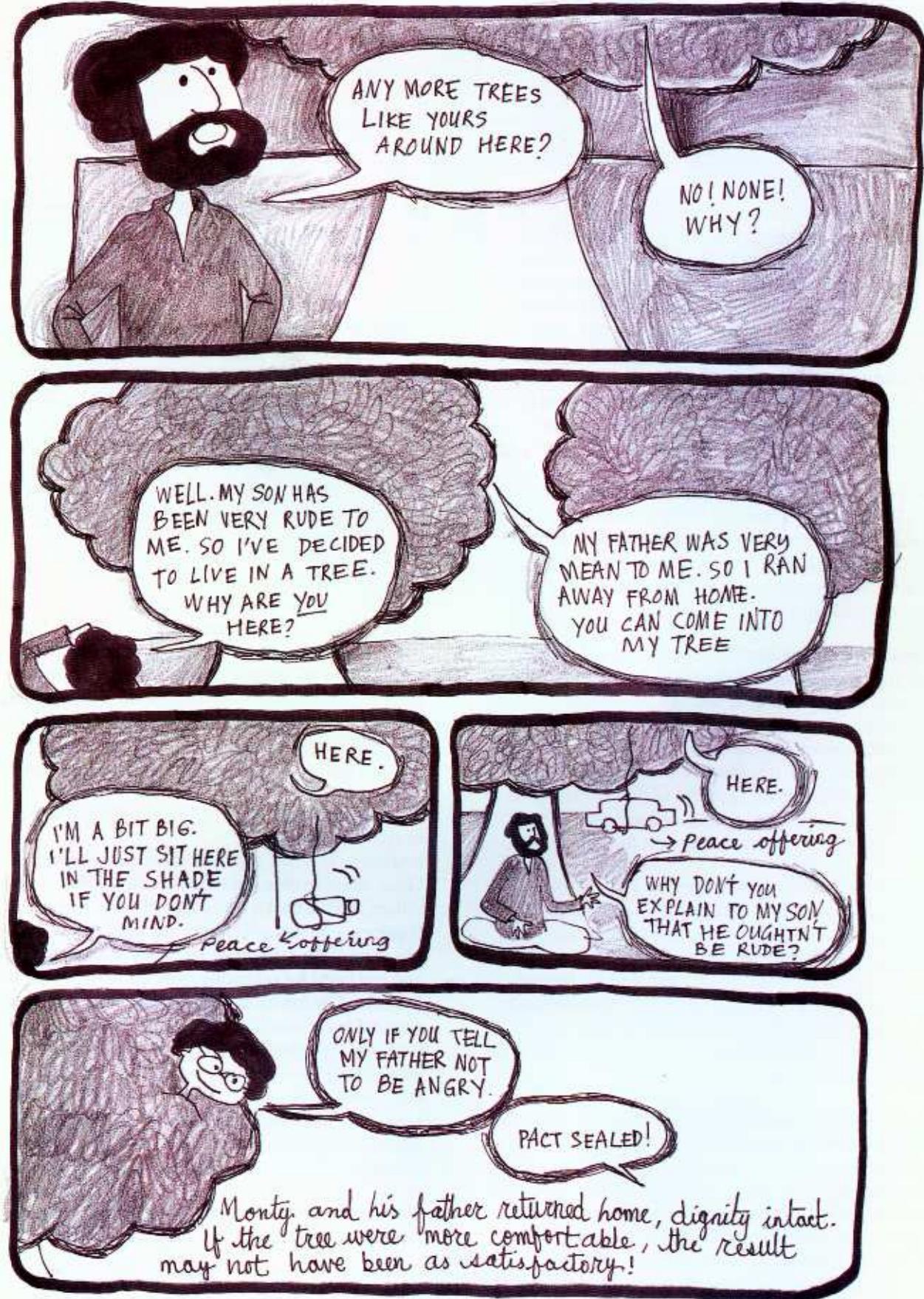


Father trotted out to the tree where Monty was ensconced. He tried climbing some adjoining trees, but didn't get far.

← Monty's tree

← Tree father didn't
manage to climb

HEHE!





Wish for Bhutan

As Bhutan embraces democracy and change I hope it becomes more like itself and not less. Not much good can come out of this tiny little secret of a place becoming indistinguishable from its gigantic neighbours. On the contrary, it could lead the way for them and rest of the world, says Ashish Rajpal.

The climb to Taktshang monastery is not steep but it is unrelenting. Narrower trails deviate from the main path, offering shorter but more effortful options to ascend. From the majestic perch of the monastery you look down the sheer cliff face and its unending 2300 feet drop into the Paro valley below. An excellent day trek, with challenge and reward even for the experienced explorer. Taktshang means 'Tiger's Nest'. Legend has it that the Rinpoche credited with bringing Buddhism to Bhutan in the 8th century, flew on the back of a tiger to the rock face to quell the evil spirits.

Earlier this year, the Himalayan kingdom commenced its own flight towards democracy led by a young King eager to quell his powers, hand them back to the people. An effort that requires the persistence and delayed gratification of a climber. An effort that promises a rewarding future for Bhutan's children.

Bhutan defies instant classification. Thimpu and Paro are peaceful, soulful mountain townships - quite unlike our own thoughtlessly devastated, ill-managed 'hill-stations'. Monasteries abound, prayer flags flutter, little boys and girls wear their flowing national dresses to schools, are instructed in English and learn Dzonkha. The Bhutanese adore their monarch, are un-fiercely cognizant of their Tibetan-Buddhist heritage, pamper their guests silly, and pass on their properties to their daughters. They do it their way.

US-educated, *Goh*-clad, *paan*-chewing, Prado driving elite dot the landscape as comfortably as the *Dzongs* and *Gompas*. Some have returned to serve the King and country at considerable personal sacrifice; others worry furiously about the future of their land, perhaps because their own is now less secure. They are not defensive about the occurrences of polyandry or polygamy. Most don't have a chip on their shoulder about big brother India or any other brother for that matter.

A civilisation in delicate, near precarious balance now takes a bold step towards an uncertain new future. In their new constitution they are now solemnly pledging to '*Strengthen the sovereignty of Bhutan, to secure the blessings of liberty, to ensure justice and tranquility and to enhance the unity, happiness and well being of the people for all time.*' Three decades ago a benevolent King coined the term 'Gross National Happiness' - and now the people have the power to

pursue it with their own free will. As Bhutan excitedly embraces democracy and the world outside, it must equally embrace itself. Here are three wishes for this blessed land.

1. Create a Bhutan Model of development.

If there was ever a case to make an entire country a world heritage site, this is it. Not to fossilize its present, but to sustain its natural and cultural heritage. A model which identifies and executes truly modern ideas of development and not a stale replay of Western or Chindian happenstances. Be it carbon credit systems, social forestry, organic farming, sustainable town-planning, universal healthcare and education, pluralism and many others - Bhutan must find its own truth and implement it for the good of its present and future generations.

2. Not disown its Drupka Kunleys.

The Western (read Judeo-Christian) consciousness seems to be the collective consciousness of the dominant, emerging world order. Beyond that, a singular culture has overwhelmed the senses in food, drink, dress, entertainment, propriety, and lifestyle - and usurped the representation of 'modern' or of 'progression.' Bhutan, admittedly with its somewhat foisted cultural homogeneity, still defiantly promises the possibility of a future that may be different.

3. An Education City that will be the new Taktshang to the world.

Leveraging its strategic geopolitical location between India-China, its eco-system and natural beauty, Buddhist roots and culture, and the unique philosophy of Gross National Happiness - Bhutan can create a city dedicated to the education of the 21st century and beyond. Creating know-how and talent for enhancing gross world happiness, the Education City can focus on knowledge most relevant to mankind in the coming century: the human sciences (biological, psychological, medical); ecology management (waste management, alternate fuels, environment conservation, clean technologies; hospitality businesses); and social leadership (poverty alleviation, education, entrepreneurship). It will be the pilgrimage of choice, not unlike Taktshang, for all seekers.

Bhutan can do it. It's small enough, brave enough, and generous enough to do it. For itself, and for all of us. □

Ashish Rajpal is the MD of iDiscover Education

